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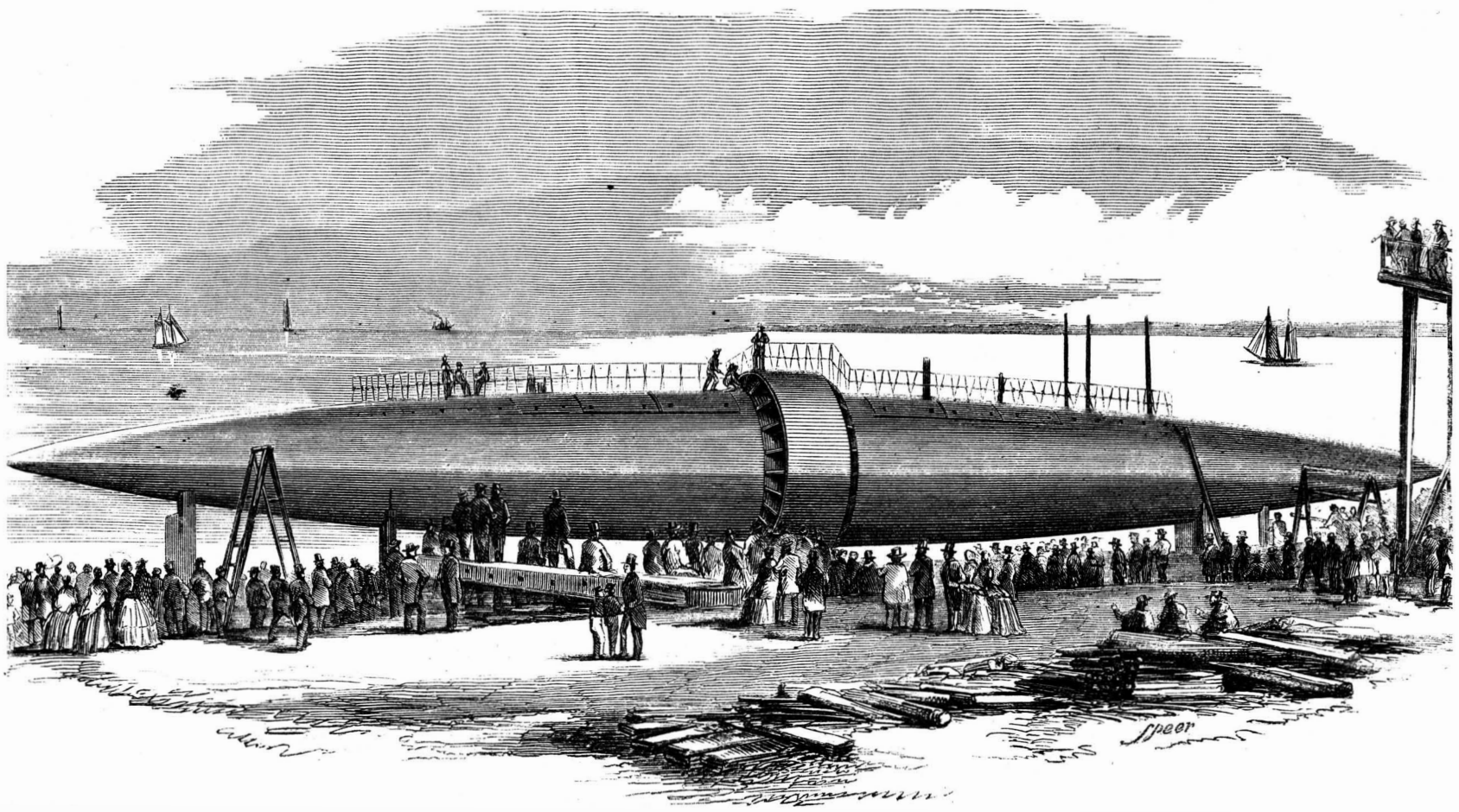


THE WINANS STEAMER IN COURSE OF CONSTRUCTION AT BALTIMORE.

Two weeks ago, we noticed the novel steamship in course of construction by Messrs. Winans, of Baltimore, Md. We now give a view of it taken from a photograph, and also a longitudinal section, from which our readers will be able to gain a proper idea of the vessel. In their own words, the explanation of its merits are as follows:—

"It has been with a view to obtaining greater safety, dispatch, uniformity and certainty of action, as well as economy of transportation by sea (taking shipwrecks and other casualties and risks into consideration), that we have devised and combined the elements exhibited in the vessel in question.

"Experience has shown that steam power on board sea-going vessels, when used in aid of sails, insures, to a great extent, dispatch, certainty of action, and uniformity in the time of their voyages. Now, we believe that, by discarding sails entirely, and all their necessary appendages, and building the vessel of iron, having reference to the use of steam alone, the most desirable ends may be even still more fully obtained.

"The vessel we are now constructing has reference to these objects, and is for the purpose of experiment, to enable us to test the accuracy and practical value of our peculiar views. It has no keel, no cut-water, no blunt bow standing up above the water-line to receive blows from the heaving sea, no flat deck to hold, or bulwark to retain, the water that a rough sea may cast upon the vessel; neither masts, spars, nor rigging, The absence of sails not only renders the parts thus abandoned by us useless, but their abandonment in a vessel such as ours will, we believe, most materially promote safety, easy movement, or diminished strain of vessels in rough weather, will save dead or non-paying weight, insure simplicity and economy of construction, and will give greater speed in smooth water, less diminution of speed in rough water, as well as diminished resistance to moving power at all speeds, in all water, and result in shortening the average time of making sea voyages.

"The length of the vessel we are building is more than eleven times its breadth of beam, being 16 feet broad and 180 feet long. This whole length is made available to secure water-lines, which are materially more favorable to fast speed, and also to diminished resistance to moving power at all speeds, than the water-lines of any of the sea-going steamers now built, the best of which, looking to speed and ease of movement, have a length of only eight times their breadth of beam. The portion of our vessel not immersed has the same lines as that immersed, so that it will pass easily through the heaviest sea; while, from its form and construction, no water can be shipped that will sensibly augment the load, or endanger the safety of the vessel, which may, we believe, be propelled at its highest speed in rough weather with an impunity which is far from being attainable with vessels, as now built, to be propelled wholly or in part by sails. It is believed, also, that the plan and position of the propelling wheel in this vessel is such that its

Fig. 2

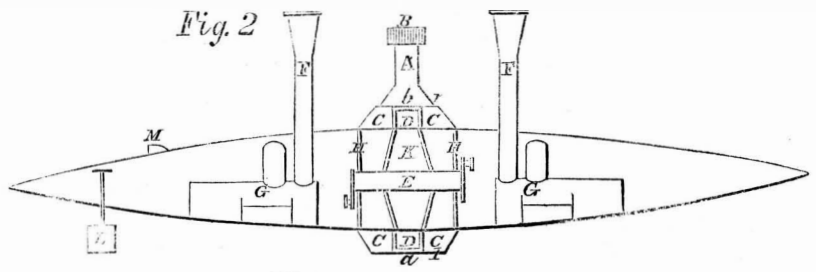
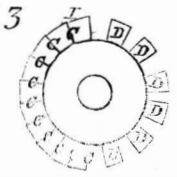


Fig. 3



minimum hold of the water will be much greater in proportion to tunnage of vessels than the maximum hold of the propelling wheel or wheels in ordinary steamers, thus enabling the full steam power to be applied, with it maximum effect, at all times, and uniformly, thus making available those properties of the hull of the vessel which allow it to be propelled at half speed in the roughest sea.

"The engines are high pressure, and have a cut-off that is variable from one-sixth to full stroke. They are four in number, and, combined, will exert three-fold more power in proportion to displacement of water than those of the most powerful steam-packets now built.

"The boilers are similar to locomotive boilers in plan and construction. and can consume about 30 tons of coal in 24 hours.

"The above peculiarities of construction, it is believed, will enable the present vessel, even notwithstanding the decided disadvantage she will labor under from her small size, to make better speed in smooth water than usual. It is believed, however, that the greatest advantages will be those exhibited in heavy weather, enabling her to exceed the average speed heretofore made upon the ocean.

"Again, the vessel being built entirely of iron, she will be free from all danger from fire and, from the number of her distinct and water-tight compartments, she will be comparatively free from danger of sinking in case of collision or other mishap, as any one or even several of the compartments might be filled with water without seriously endangering her safety. And further, the form of the vessel, while it makes her stronger than usual, is such as to afford the least possible hold for the wind and waves: so that the danger of injury from heavy seas or storms is small. For these reasons, it is believed that the vessel will be an unusually safe one.

"The fact that every portion of the hull or outer shell of the vessel is arched in all directions and the entire material is in the best position and form to resist the various strains that it can be subjected to at sea, gives it an important advantage in point of strength, safety, and buoyancy over any other sea-going vessel

"The form and construction is remarkably plain and simple, resulting in great economy of material and workmanship, and facility of construction. The less the weight of material the greater, of course, the capacity for carrying paying freight, and the less will be the resistance to moving power in proportion to such freight. With 200 tuns of coal on board, the present vessel will displace about 350 tuns of water, and will accomodate about 20 first-class passengers and the United States mail, with room to spare for small valuable packages, specie, &c.

"We believe that shorter average ocean passages than have yet been obtained are desirable, and may be had by vessels constructed on our plan; and if they are confined to carrying passengers, the mail, specie, and such other freight as can well afford to pay a high rate, in consideration of extra dispatch and safety, we believe that they will pay better and be more useful than the vessels now used for these purposes."

Thus far we have given Messrs. Winans' own remarks; Figs. 2 and 3 we will describe in our own style. Fig. 2 is a vertical longitudinal section of the ship, and Fig. 3 a view of the propellers which are arranged between the two halves of the ship, and are protected by a sleeve or guard, I, from being damaged

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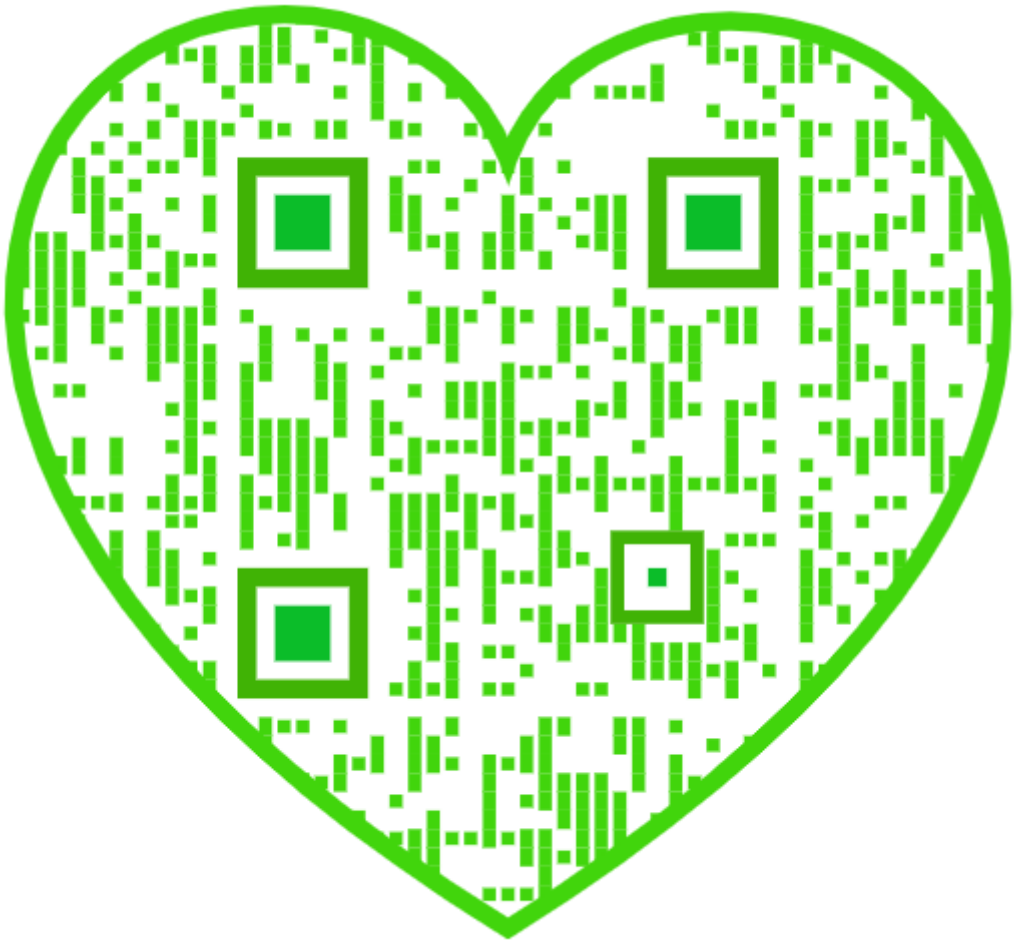

by floating timber, drift, or the piers at which it may be lying.

A is the ventilator; B the look-out; C the ribs, connecting I with the sections or compartments; D D are the blades of the propeller; E the main shaft to which is secured K, the propeller drum; F F are the smoke stacks; G G the boilers; H H the frames; L the rudder; and M the pilothouse. Such are the construction and principles to be demonstrated in this steamboat, which is without sails, so that if any accident occurs to the machinery, it must lie a helpless log upon the waves. However strongly its parts may be secured together, its shape is an unstable one, as any one can see for themselves by observing the motion of a barrel on waves or any rough water.

Theory and practice have demonstrated that the "wave line" system is the true one on which to construct vessels that are to cleave the waters with *safe* rapidity, but this boat does not admit of these lines. Again, the long and narrow ships have been found to roll almost too much as it is, ; what then may be expected from a ship much narrower in proportion than any ship now built and which is so shaped as to sail equally well in any position? Iron ships are now constructed, and the use of this material, and the construction of ships in compartments, on which Messrs. Winans lay so much stress, is, as perhaps our readers are aware, not novel. On the whole, looking at past experience in shipbuilding, we have no hesitation in saying that the cigar build will prove no success, and that the experimental one will most likely be the last. Messrs. Winans have patented the novelties of the ship, as will be found by looking to the List of Claims in another column.

Brother Jonathan at some of his Tricks.

The London *News* of the 16th contains a letter from St. Petersburg which makes the following remarkable disclosure :—

The result of the calculations lately made by the well-known astronomer, Professor Struve, of the University of Dorpat, relative to the true geographical positions of St. Petersburg and Moscow, and the distance between the two capitals of the empire is, that the actual length of the railroad is by astronomical observation, no less than 88½ versts (about 60 miles) shorter than its nominal length of 607 versts, or, in other words, that the government on whose account the railroad was constructed, has had to pay about one seventh of the value, or twelve millions of roubles more than it ought to have paid. As the rolling stock of the St. Petersburg and Moscow Railway is furnished by an American company, who are paid for the same at so much per verst, it follows that in this quarter the government have been paying also a most fearful overcharge. The poles erected along the line to denote the distances have been systematically fixed in the wrong places so as to mislead both the government and the public.

The Emperor was in the most violent state of excitement on learning the above, and gave immediate orders for the strictest investigation into the facts of the case to be made, with a view to inflict the most summary punishment on the parties inculpated in this nefarious transaction; but as so many persons of the highest rank and importace anre compromised in the affair, it is not likely that the investigation will be continued, but on the contrary the matter will be hushed up to prevent the public scandal of the real delinquents being exposed and made to suffer the penalty they so richly deserve, for the share they have taken in this atrocious fraud.

[Mr. Thomas Winans has, in a communication to the Baltimore *Sun*, denied in the most indignant terms the truth of the foregoing statements. He attributes them to the jealousy of English engineers, and asserts that as the route was surveyed by Russian engineers, even if there were errors committed, Americans cannot be held responsible for this—an incontrovertible argument.

Issued from the United States Patent Office

FOR THE WEEK ENDING OCTOBER 26, 1858.

[*Reported officially for the Scientific American.*]

. Circulars giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

TOOLS FOR MANUFACTURING WIRE RIDDLES—Sanford Adams, of Boston, Mass. : I claim the described tool for manufacturing riddles, having teeth, m and s, operating in the manner substantially as set forth.

WASHING MACHINES—William T. Armstrong, of Sandwich, Ill. : I am aware that rubbers for washing machines have been made with alternate ribs and small smooth inverted curves, therefore I do not claim such rubbers, but only claim a rubber for washing machines, when the inverted curve is ribbed as described in the specification.

I claim in the described washing machine, making one or more inverted ribbed curves, N O, in an arched or curved rubber, substantially as described.

SCRUBBING MACHINES—Samuel M. Barnett, of New Orleans, La. : I claim the trilateral frame, A, provided with the soap and water boxes, d e, arbor, B, with brush, c, attached, and the movable bars, G, with brushes and sponges, m n, either or both, or their equivalents attached, the whole being arranged as and the purpose set forth.

[This invention consists in having a trilateral frame provided with a vertical arbor, to which a brush is attached, the frame being also provided with adjustable bars, to which small brushes and wipers, or mops, are secured; the frame being mounted on casters provided with soap and water reservoirs, so that by this arrangement the operation of scrubbbing can be performed quickly with very little labor.]

GRAIN-DISCHARGING ATTACHMENT TO HARVESTING MACHINES—J. F. Black, of Lancaster, Ill. : I do not claim the employment or use of the endless apron, P.

Nor do I claim an intermitting rotary discharging device in connection with said apron, for they or their equivalents have been previously used for the purpose specified.

But I claim operating the gavel discharger, that is to say, the rotating arms, g, of shatt, J, from the driving wheel, C, through the medium of the wheel, H, provided with the slot, a, and tooth, e, and the pinion, I', provided with a quadrilateral plate, b, as and for the purposes shown and described.

[This is an improvement in that class of rakers, or rather, grain-discharging attachments, for reapers, in which an endless apron is used for carrying the cut grain from the platform. The object of the invention is to obviate, by a very simple means, a difficulty hitherto attending the simplest form of the above class of discharging devices, to wit, the irregular discharge of the gavels due to the casual movement of the intermittingly moving parts.]

CAR SEATS—A. C. Blondyn, of St. Joseph, Mo. : I claim the combination and arrangement of the swinging frame, B, extending and rolling mattress, E, the roller, D, shaft, H, roller, H', and cord, G, or their equivalent, for operating said mattress, and the sectors, N, to which the seat bottoms, M, are secured, by which a seat facing either end of the car, or a reclining or or sleeping couch, capable of accommodating the two occupants of the seat, can be obtained, the whole being constructed and operating substantially as described.

[This seat is placed within a swinging frame, its backs being formed of a stuffed mattress, capable of being partially turned upon a small roller or windlass when the seat is used for sitting purposes, or extended to the full length of the frame when employed as a couch. The seats and backs are so combined as to form seats with their backs toward either end of the car, or comfortable couches overlapping each other.]

CHURNS—James H. Bump, of Morris, N. Y. : I do not claim, broadly, the invention of a hollow dasher rod for the admission of air to the cream.

I do not claim forcing air into cream, or supplying cream, while subjected to the operation of churning, with oxygen, for this has been previously done.

But I claim the arrangement and combination with the churn of a chamber, C, through which the air that mingles with the cream is made to circulate, substantially as and for the purposes shown and described.

[A current of air of a proper temperature is forced through the cream, while the latter is being subjected to the process of churning, in order that a full supply of oxygen may be obtained, and all the butter the cream contains may be separated in the best possible condition. The invention is in the peculiar means employed to attain this end.]

EXTENSION SPLINTS—William Bunce, of Sullivan, Ohio : I do not claim any of the described devices, separately considered.

But I claim the combination and arrangement of the side pieces, B D E, forming with the band, c c' g g', and set screws, an adjustable splint, the foot piece, A, with its joint, b, and set screw, the flexing braces, F, the extension bar, K, the windlass, N, and cord, M, the perineal pad, H, and pads, 1 2 2 4, all combined and arranged as described, so as to form an extension splint operating in the manner substantially as set forth, for the purposes specified.

STEAM PUMPING ENGINE—Ezra Cope, of Cincinnati, Ohio : I am aware that steam and water passages have been employed in the trunnion for engine and pump, as shown in Sprenkle & Basstord's patent, of December 22, 1857; also that guide rods have been employed to connect the piston rods of stationary cylinders, and by myself and J. W. Bragg, as shown in patent of March 23, 1858. I do not claim these singly.

I claim the arrangement of steam and water passages, both in one trunnion, and guide rods to complete an independent pumping engine.

I further claim arranging the escape steam passage, to separate the steam supply and water passages, to prevent condensation of the supply steam, all substantially as and for the purposes set forth in the specification.

WASHING MACHINE—Theodore G. Eiswald, of Providence, R. I. : I claim the washing of clothes by means of the arrangement, construction and combination of the two cylinders, A B, revolving in different directions, substantially as and for the purposes shown and described.

CIDER MILLS—John Eiberweiser, of Cincinnati, Ohio : I claim the particular construction and arrangement of two cylinders, constructed in such a manner as described.

BRICK MACHINES—Thomas Forbes, of Kansas City, Mo. : I claim the arrangement and combination of the variable rods, H, with the sockets, h, pinions, g g', and spur wheel, I, as and for the purposes shown and described.

[A peculiar pressing device and a reciprocating discharging bar, arranged relatively with a mud mill, are employed in this invention, together with an adjustable bed piece. The machine is more especially designed for the application of horse or other power, and with a view to facilitate the manipulation, to wit, the ready adjustment of the empty molds into the machine, and the discharge of the filled molds therefrom, and also graduating the pressure to which the clay is subjected as circumstances may require.]

GRAIN SEPARATORS—Aaron Foster, of Quincy, Ill. : I claim the arrangement of the annular receptacles, m and n, in combination with the trumpet-shaped cone, o, and also the employment of the interior of said cone o, as an additional receptacle together, for the purpose of assorting the mixed grains, after separation from the wheat, according to their respective qualities, substantially as described.

BEDSTEAD BOTTOM—Samuel E. Hartwell, of New York City : I claim the adjustable rack, f, carrying the elastic loop, g, and connected to the slat, c, by the clasp, e, substantially as and for the purposes specified.

SELF-MOUSING HOOK—John R. Henshaw, of Middletown, Conn. : I am aware that catches and devices similar to the hook described, have been used in the way of jewelry, for chain catches and watch hooks, but so far as I am aware, such devices in which springs are employed have had the springs exposed and would not answer the purpose designed, for the invention described.

I do not claim, therefore, the employment or use of a snap or spring bar attached to a hook, irrespective of the arrangement of the spring, for the purpose of protecting it.

I claim as an improved article of manufacture, a self-mousing hook, having a socket, e, and ear, f, and a horizontal spring, k, the whole made as shown and described.

[This invention consists in attaching to a hook a snap or spring, so arranged that it will yield or give, to allow the hook to be passed through the thimble, or other article to which it is to be connected, the snap or spring bar being thrown back to its original position when the hook has passed through the article, by a spring, which is fully protected from injury or casual displacement by the article through which the hook passes, and which is retained upon the hook by the snap or spring bar. This device is specially designed for naval or maritime purposes.]

RAILROAD SWITCHES—Simeon Heywood, of Claremont, N. H. : I am aware that movable frogs have been used, and are now in general use, especially in city roads, but so far as I am aware, they have in all cases been used separately or detached, performing the office of a switch rather than that of the original stationary plate, which was known by the term of frog. I therefore do not claim, separately, any of the parts shown.

But I claim the arrangement and construction of the bent or curved bars, F G, having racks, H, attached, and operated by a pinion, J, as and for the purposes shown and described.

[In connection with the ordinary switch rails this inventor uses a movable frog, so arranged that the switch and frog will be operated simultaneously by the movement of a single lever or shaft, and the frog, as well as the switch, moved in line with the rails over which the train is to pass. By this improvement a continuous track is formed, thereby obviating the objections to the usual stationary frog, to wit, the danger of the cars being thrown from the track, and the wear and tear of the switches, as well as the wheels and running gear generally of the cars, in passing over switches.]

PEN FOUNTAINS—Josee Johnson, of New York City : I claim the application to the ordinary pen of a spiral spring fountain, A, when constructed with an adjustable band, B, in the manner described and for the purposes set forth.

MACHINES FOR MAKING CANDLES—John Jones, of Baltimore, Md. : I do not claim the supplying of the wick as described, nor the cutting of the candle by bringing two knife-edges together.

But I claim the feeding and packing roller, A, with blades moving alternately in and out by the cam, G, as shown, or by an eccentric or any other device, for the purpose of feeding and working tallow, wax, or other plastic material.

I also claim the combination of one or more feeding and packing rollers, A, with the various molds for the different purposes to which it is applicable.

I also claim the entire combination of the machinery for the purpose of cutting and removing the candles, as described.

CHEESE PRESS—Hartwell Kendall, of East Dorset, Vt. : I do not claim applying the power either directly to the eccentric, or through the same, by means of the additional gearing.

But I claim applying the power through the sliding frame, F G H K, by means of the ratchet wheel, O, and the pawls, lever, and crank, connected therewith, or their equivalents, so that the shaft of said ratchet wheel shall act upon and move the eccentric, at the same time serving as an anti-friction roller, whereby simplicity, lightness, and compactness of construction, and greater efficiency of action are secured, as specified.

CHIMNEY CAPS—Bernhard Kihlholz, of St. Louis, Mo. : I claim the described chimney smoke regulator, consisting of the pipe, F, deflector, E, and cap, D, enclosed in cylinder, C, attached to cover, A, the whole constructed and arranged substantially as and for the purpose set forth.

DINING AND OTHER TABLES—Alexander Kinkead, of Washington county, Ohio : I claim the combination and arrangement of the adjustable drawer-like or chambered rotating tablet, L L2, with the hinged upwardly folding disk, J J K K, when constructed as shown, and used with a dining or other table, for the purposes substantially in the manner as set forth and described.

GASOMETERS—George W. Kraft, of Philadelphia, Pa.: I do not claim the ordinary square cup represented by the outer section, Fig. 2.

But I claim the construction and application of the V-shaped cup or lute, whether as shown by the inner section, Fig. 2, or by the inner and outer section, Fig. 3, and this I claim whether it be accomplished precisely as described, or in any manner equivalent thereto, producing substantially the same result.

FLAT IRON—David Lithgow, of Philadelphia, Pa. : I claim the combination of the two jet pipes, E E, and the heating plate, F, in the manner substantially as described.

SPOKE MACHINE—Luke L. Knight and D. H. Rice, of Barre, Mass. : We are aware that expanding cutter heads have been previously used and arranged and operated in various ways, and we therefore do not claim, separately, the expanding cutter heads, O O.

But we claim the employment or use of two carriages, L' L', in combination with expanding cutter heads, O O, or any proper cutting tool, arranged to operate substantially as and for the purpose set forth.

We also claim the circular saw, U, in combination with the expanding cutter heads, O O, when the parts are connected so as to operate conjointly, as shown, to wit, as regards their lateral and rotating movements, and used in connection with the carriages, L' L', for the purpose specified.

We further claim the loaded arms, e, attached to the swivels, d, the arms being forked at their outer ends and used in connection with the curved bars, j, the whole being arranged substantially as and for the purpose set forth.

[In this invention two carriages are employed in connection with a proper cutting tool or tools, so arranged and operated that, when the machine is in full operation, two spokes are in course of construction at the same time, and the desired work is produced in a rapid and perfect manner, and a simple machine obtained.]

BRICK MACHINES—John Kutts, of Philadelphia, Pa. : I claim the main cylinder, F, when constructed and arranged in the manner and for the purpose specified, that is to say, with the stationary hollow axis with the beams or truss, J, through the same the eccentric collar, H, piston, G, with its knuckle joint and shoe, K, and division plates, O, these several parts being constructed, arranged, and operated as and for the purposes set forth.

I also claim the arrangement of the double chamber or box beam, W, over the cylinder, F, as described, in combination with the back horizontal pistons, b, and cut-off slide, e, propelling bars, m and n, and levers, i and k, all arranged for joint operation in the manner and for the purpose set forth.

I also claim the compound or double levers, A and B, in the box, H', over the press beam, X, when these are constructed and arranged in connection with the gearing or fly wheel, J, substantially in the manner and for the purpose set forth.

I also claim the double rimmed elevating and filling boxes, T, D2, Nos. 9, 10, and 11, when constructed as and for the purpose specified.

I also claim the pulverizers, A2 3, when constructed, arranged, and operated in the manner and for the purpose specified.

I also claim the fly or wing wheel for lowering the brick from one belt to another belt at right angles thereto, when constructed, arranged and operated substantially as described.

BRIDLES TO PREVENT HORSES FROM KICKING OR RUNNING AWAY—John M. Lanier, of Eufaula, Ala. : I do not claim the employment of two bits operating upon one jaw of the horse.

Nor do I claim operating one bit by means of two sets of reins.

But I claim the employment of two bits, so arranged with two sets of reins that one bit will operate upon the lower jaw, while the other operates upon the roof of the mouth and upper jaw, the same being combined and operated in the manner and for the purpose specified.

LAMP WICKS—James Y. Leslie, of Brooklyn, N. Y. : I claim as a new article of manufacture a lamp wick composed of a single yarn when double looped as shown and described.

[This improved lamp wick is made by enchaining a series of loops in a single yarn by a peculiar process of looping, so that a very perfect wick is obtained.]

PADDLE WHEEL—Richard B. Locke, of Stapleton, N. Y. : I do not claim the use of buckets having the form of parallelograms, arranged with their angles directed toward and from the axis of the wheel.

Nor do I claim the making of buckets of zig-zag form.

But I claim connecting the plates, D, to each other, or to staying rings at their adjacent angles, d d, substantially as shown and described, for the purposes set forth.

[There have been many unsuccessful attempts to improve the paddle wheel, each in its turn discovering that some important consideration had been omitted. This inventor, who has seen much of naval matters, has produced a wheel in which everything that can benefit has been taken hold of, and all the unnecessary appurtenances thrown away While giving more hold on the water, whichever be the direction of rotation, no more friction is introduced, and there is no lift water, foam, or disturbance in its passage through the sea or river. Although constructed on the most scientific principles it is simple in the extreme. The buckets are formed like three-fourths of a W, and are cut diamond-shape. From experiments that have been made, its power has been found to exceed that of the ordinary wheel by a large percentage.]

HYDRO-CARBON VAPOR BURNERS—Alonzo M Mace, of Springfield, Mass. : I do not claim any particular form of a chamber connected with the crown of a vaporizing tube.

But I claim the use of a heating chamber, A, connected with vaporizing tubes at the crown or upper part and over the flame, the same being constructed substantially in the manner and for the purpose set forth.

COTTON PRESSES—Cornelius Martratt, of Waterford, N. Y. : I do not claim the lever or the follower with movable fulcra to be new, as they have been used in other presses.

Nor do I claim the racks or pinions, as they are also used for various purposes.

But I claim the application of the racks connected to the frame, in combination with the pinions and side shafts revolving freely, and connected to the sides of said follower, for the purpose of distributing the pressure equally over the surface of follower as it is raised, and obviating the tipping and end-strain, and diminishing the friction, substantially as set forth.

TRANSIT INSTRUMENT—Robert C. Matthewson, of San Francisco, Cal. : I claim the manner in which the instrument is constructed, so as to ascertain the longitude, and run a true parallel of latitude by fore and back sights.

ORNAMENTING GLASS—Jasper S. Miles, of Ann Arbor, Mich. : I do not claim the mere ornamentation of glass by the application on one side of it of coloring matters, to produce a variegated appearance, as I am aware that tortoise shell and other substances have been imitated in this way.

I am not, however, aware of the existence of any method of ornamenting glass which produces the same variegation and tree coral-like distribution of color as there is in my coral glass, which I regard as a new manufacture.

I claim the said manufacture produced by the combination of two plates of glass with coloring matters by a process like that specified.

[The colors, which may be zinc white, vermillion, Paris green, ultramarine blue, or others, are ground very fine, and mixed with boiled linseed oil and Damar varnish. These are then laid on two pieces of glass with a dubber or brush, and one piece of glass placed on the other, with their painted surfaces in contact. They are then worked upon one another slightly with the hand, separated, and left to dry; they are again placed

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in contact, and secured together, and when seen with the light shining on them, have a highly ornamental appearance. When viewed placed between the observer and the light, the coralline or foliated appearance is distinctly visible.]

REFRIGERATOR—Jas. Naughten, of Cincinnati, Ohio: I claim the combination of the valves, H I, and rods, M K, arranged and operating substantially as and for the purposes set forth.

DEVICE FOR ELEVATING WATER BY THE COMBUSTION OF A VOLATILIZABLE HYDRO-CARBON—Robert Nelson, of New York City: I am aware that a vacuum has been produced in receivers by the explosion of inflammable compounds. Gunpowder has been used, and also inflammable gases compounded with atmospheric air. Many explosive engines have been devised in which it has been essayed to obtain power both directly and indirectly by the explosion either of inflammable solids and fluids, or thin vapor or gases.

But I am not aware that a water-elevating device has ever been devised in which hydro-carbon fluid has been volatilized, and the vapor exploded by the same fire or source of heat, for the purpose of producing the requisite vacuum within a receiver.

I therefore do not claim, broadly, producing a vacuum within a receiver, by expelling the air through the agency of an explosive substance or compound.

But I claim elevating water by producing a vacuum with a proper receiver, A, by means of any hydro-carbon fluid, when so applied and arranged with suitable mechanism that the fluid will be volatilized in proper or desired quantities, and exploded by one and the same source of heat.

I further claim the particular means employed for volatilizing and exploding the hydro-carbon fluid, to wit, the box, M, provided with a lamp, N, and valve, O, and attached to the box, G, into which the tube, J, being provided with a cock, L, which, as well as the valve, O, is operated by the movement of a slide, g, substantially as shown and described.

[Water is elevated by this invention by producing a vacuum in a suitable receiver by the combustion of the vapor of any volatile hydro-carbon, so applied and used in connection with suitable mechanism that the vapor will be generated and ignited from the same source of heat. The inventor has assigned a portion of his patent to J. H. Lidgerwood, No. 9 Gold st., New York.]

RAILS FOR STREET RAILROADS—Samuel Nicolson, of Boston, Mass: I do not claim making the railroad car wheel bearing surface of the rail with a flat or slightly curved top, having its corners rounded down to quadrantal arcs, such being the common way of forming the said rail.

But I claim making the rail with the straight or slightly curved inclined surface or plane, a c, arranged with respect to the surface of the street, as shown, and for the purpose as specified.

I do not claim a concave curved guard, d e, for the flange guard.

But I claim as an improvement in the guard, making it a flat plane, arranged as shown at d e.

I also claim making the inside corner of the rail angular, with reference to the upper surface of the horse tread, as shown at f.

COOKING STOVES—John Pearson, Jr., of Newburyport, Mass.: I claim the combination and arrangement of the hollow back, E, of the fireplace, with the oven, B, the fireplace, c, and the flue, I, whereby the heat of the fireplace and the said flue is made to warm the air which passes into the hollow back, such air being subsequently discharged into the oven as described.

I also claim the combination and arrangement of the smoke flues, I K K K, and the air flues, O N M M, the whole being disposed with respect to the oven, essentially as described.

I also claim the air guard, S, as arranged on the upper smoke flue, and with respect to the air register and discharge pipe thereof, substantially in manner as specified.

RAILROAD CAR COUPLING—Philander Perry, of Troy, N. Y.: I claim the combination of the horizontally and vertically moving links, f f, with the parts, C D E, which adjust said links, f f, perpendicularly, so as to suit different hights of platforms, and with the vertical lever, L, and horizontal rod, R, for moving the links apart horizontally, so as to disconnect the cars, and with the sliding spring boxes, a a, which allow the cars to approximate without straining the pins when the cars crowd upon one another, substantially as and for the purposes set forth.

COPYING PRESS—Edwin Platt and Jacob B. Platt, of Clarke county, Ga.: We claim the stirrup, F, and its plates, arranged and operating substantially as set forth and described.

We also claim the frame, A A' A'', in combination with its levers, so arranged with the bed plate and follower as that they can be easily separated from each other, and then packed to form a portable copying press.

WASHING MACHINE—Joseph F. Pond, of Cleveland, Ohio: I claim the suspension of the rollers, R' R'', upon the vibrating bars, f f, at the extremities of slide rods, b b, in combination with the spring, d, and upper roller, R, the whole constructed, arranged and operating substantially as and for the purposes set forth.

MODE OF OPERATING PUMPS—Daniel J. Rogers, of Magnolia, N. C.: I claim the arrangement of the intermediate auxiliary lever, flexible frame, C D D E, pistons, elevated rocking shaft, F, elevated weighted rod, G H, and pendulous handle or lever, I, in the relation to each other shown, as and for the purposes set forth.

[This invention greatly facilitates the operation and lessens the labor and fatigue of operating pumps, as the power is applied with a greater leverage in a small compass through the flexible frame, and when the handle is attached to the rocking shaft of said framing, than when connected directly to the rocking brake or lower part of the flexible frame, and as the gravity and momentum of the elevated ball can, by using the flexible frame, be made to aid and augment the force applied, when each reciprocating movement is near its termination.]

METHOD OF INSULATING AND SUPPORTING LIGHTNING RODS—Elkanah C. Rogers, of Boston, Mass.: I claim making the insulator cap, c, with the adjustable or turning loop, a, applied to it, and arranged so as to operate substantially as described.

I also claim combining with the rod or conductor an adjustable rest, G, applied to it and the insulator-cap, substantially in the manner and so as to operate as specified.

I also claim combining with or arranging in the cap, c, of the insulator, and with respect to the insulating material an annulus or ring, L, applied substantially in the manner and for the purpose set forth.

TILLER ROPE PROTECTOR—John Sample, of Meadville, Miss.: I claim placing a double casing of metal, made in sections, so as to reach their interior, and with air space between them, around, over, or under the tiller ropes of vessels, to protect them from the accidents of fire, substantially as described.

CONNECTION OF STEAM ENGINES WITH PROPELLERS OF STEAM VESSELS—Ross Winans and Thomas Winans, of Baltimore, Md.: We claim the combination of two engines or sets of engines with an intermediate vertical transverse propelling wheel, to the shaft of which the engines are directly connected, substantially as set forth.

STEAM ENGINES—C. A. Schultz, of New York City: I claim the revolving cam wheel, M, with the opening cams, c c, and adjustable cut-off cams, d' d', constructed as described.

Second, I claim the socket, L, with guide rods, e e.

MACHINE FOR MINING COAL—Elisha Simkins, of Allegheny, Pa.: I claim, first, The arrangement of the double or compound slide, C, and sliding frame, d, when used in connection with the stationary frame, a, and operated by the screws t and u, and the nut, s, as described and for the purpose set forth.

Second, The arrangement of the cam, r, slide rack, h, wheel, o, shaft, 2, shifting piece, 3, levers, z and y, ratchet wheels, p 1 and p, and the ratchet pawls, B 1 and B, for the purpose of moving the upper end of shaft, 3, back and forward, and for operating the screws, t u, as described and set forth.

Third, The arrangement of lever, 10, and the connecting rod, j, for the purpose of regulating the angle of the picks, g, as described and as set forth.

Fourth, The arrangement of the flexible connecting rod, r, the crank, n 1, the shaft, 3, the arms, k, the pick receivers, l, and the picks, g, as described and for the purpose specified.

WASHING MACHINE—H. E. Smith, of Philadelphia, Pa.: I do not desire to confine myself to the use of a coil for superheating the water, as other heating apparatus equally as efficient might be used.

But I claim the vessel, B, with its yielding valved diaphragm, J, and the perforated diaphragm, I, or its equivalent, in combination with a pipe, G, communicating with the vessel at a point above, and the pipe H, at a point below the said diaphragms, and both pipes communicating with any suitable heating apparatus, substantially as and for the purpose set forth.

MACHINE FOR DRAWING BOLTS—C. L. Stevenson, of Charlestown, Mass.: I claim a machine for drawing bolts from timber, consisting essentially of the rotating toothed wheel, D, which is forced up to the bolt by pressure applied through the roll, E, or its equivalent.

APPLYING POWER TO CRANKS OF ENGINES—Thomas Stewart, of Philadelphia, Pa.: I claim keeping the piston rod, F, at rest, whilst the crank, E, makes about one-fourth of its revolution on each opposite side of an imaginary line passing across the center of said crank's shaft, at right angles with another, such line passing through the axis of the piston rod, the same being effected by means of the yoke, D, or its equivalent, constructed so as to operate upon the crank, substantially in the manner and for the purpose described.

BEE HIVES—Peter Taltavull, of Washington, D C.: I do not claim hives nor honey boxes with sloping bottoms and outlets therefrom simply.

But I claim the arrangement of a simple rectangular containing box, suspended diagonally in combination with honey boxes therein arranged similarly, all having outlets or passages downwards from their extreme lower edges, whereby the entire hive is rendered self-clearing, and a sloping roof, by the same arrangement is produced, substantially as specified.

MACHINERY FOR PEARLING, POLISHING AND FINISHING RICE—R. P. Walker, of New York City: I do not claim the cylinders with rubbers having reverse motions, as the same have been used in hulling coffee. &c. Neither do I claim rubbers and sheepskin in machines for hulling grains, as rubbers extending around the cylinder have been used. Neither do I claim a surface of emery, as the same has heretofore been used for a variety of purposes, and I have made use of the same in machinery for hulling rice.

But I claim the revolving cylinder, d, coated with emery and carrying the sectional rubbers of gum elastic or equivalent material, in combination with the hollow cylinder, f, revolving in the opposite direction to the cylinder, d, for the purpose of pearling and polishing rice or grains in substantially the manner specified.

I also claim the cylinder, f, constructed substantially as specified, with alternate screens and emery surfaces, to act in connection with the interior revolving cylinder, d, to remove and pass away the douse and chits, as set forth.

APPARATUS FOR GENERATING GAS—A. B. Wilson, of Waterbury, Conn.: I claim, first, The combination of a still with passages leading therefrom downward to a pipe, and so combined therewith as to protect the still from heat, the two being constructed and acting substantially as specified.

Second, I claim in combination, a gas still, converting passages and a valve, all combined substantially in the manner and for the purposes set forth

APPARATUS FOR COOLING WARTS—John Wilkins, of Troy, N. Y.: I do not claim merely some apparatus in which a current of cold water flows in a direction contrary to that of the materials which are to be cooled where the channels containing the hot materials are otherwise arranged than as specified, nor where they are made to be operated on by flowing through spaces which cannot be opened to be cleaned, nor do I claim any regulating apparatus without reference to its application to the specified uses.

But I claim, first, The cooling apparatus as described, with the thin metallic operating plate placed horizontally and fastened so as to be easily removed for the purpose of cleaning, together with the specific arrangement of ribs and joists, or their equivalents, operating as and for the purposes set forth.

Second, I claim the distributing and collecting troughs with their respective ice water and waste water troughs at the ends of the operating plate.

Third, I claim the combination of the said parts, namely, the operating plate with its joists, ribs, modes of fastening troughs at each end, and regulating valve as described, or of parts substantially the same, when they are employed as a cooling apparatus, in the manner set forth.

WINDOW STOP—Turner Williams, of Providence, R. I.: I claim the described window stop, consisting of the roller, c, shank, m, spring, E, and lever, k, or their equivalents, in combination with the inclined surfaces, d, and operating in the manner substantially as set forth.

HULLS OF STEAM VESSELS—Ross Winans and Thos. Winans, of Baltimore, Md.: We claim constructing the hull in the form of a spindle, substantially as described.

STEAM VESSELS—Ross Winans and Thomas Winans, of Baltimore, Md.: We claim, first, The combination of a spindle-shaped hull, formed of two separate, watertight vessels, united by a sleeve or framing with a propeller, arranged and operating substantially as set forth.

Second, The sleeve, in combination with the ribs or standards, for connecting the two end portions of the spindle-shaped hull, steadying the vessel as a keel does, and directing the course of the water as it enters and leaves the space occupied by the propeller.

Third, The combination of the two end portions of the spindle-shaped hull, with the towers and the bridge between them, for the purpose of affording ingress to, and egress from, each end of the hull, and a means of communication between them, and also supplying a suitable means of ventilation of the two parts of the hull, substantially as set forth.

CONSTRUCTION OF OCEAN STEAMERS—Ross Winans and Thomas Winans, of Baltimore, Md.: We are aware that it has been proposed to use an annular propeller revolving around a vessel, but such a form, from the great amount of friction produced, and its liability to distortion, owing to its want of strength could not be employed with success, besides our invention is easily distinguished from such a contrivance, as this refers only to a propelling wheel, which has a continuous radial support from the axis of rotation.

All such arrangements are therefore essentially different from ours, and we claim the combination of a vertical transverse trunk within the hull of a vessel, with a screw propeller of large diameter whose blades shall project beyond the outline of the hull substantially as set forth.

PREPARATION OF ALUMINUM—Luige Ferrari Corbelli, of Florence, Tuscany, and Vincent Paitti, of the Duchy of Modena, assignors to L. Ferrari Corbelli, aforesaid: We are aware that some of the materials which we propose to employ in our improved process have been used in processes for obtaining aluminum: we do not therefore mean or intend to claim the exclusive right to use such substances, but that which we consider to be new in the described process, and desire to claim is—

First, The combination of operations set forth, whereby we are enabled to reduce aluminum from earthy matters containing it as a base, or in combination with other matters.

Second, We claim the application of the prussiate of potash to the clay or earthy matters and the treatment of such clay or earthy matters with prussiate of potash in the presence of heat, substantially as described.

ARITHMETICAL PROOF RULE—S. S. Young, of Eaton, Ohio: I do not desire to claim the inventions heretofore patented by me, July 24, 1849, for adding numbers, and Sept. 2, 1851, for calculating interest, as these differ from the described instrument, both in their construction and in the ends effected.

But I claim the described instrument for proving the result of arithmetical calculations, when constructed and operated substantially in the manner and for the purpose set forth.

MANUFACTURE OF ALUMINUM AND CALOMEL—Luigi Ferrari Corbelli, of Florence, Tuscany, and Vincent Paitti, of the Duchy of Modena, assignors to Luigi Ferrari Corbelli, aforesaid: We do not claim, broadly, the employment of galvanic precipitation in the manufacture of aluminum.

But we claim the process described of manufacturing at the same time aluminum and protochloride of mercury by means of galvanic precipitation, as set forth.

PATCHING BALLS FOR BREECH-LOADING RIFLES—L. H. Gibbs (assignors to the Gibbs Arms Company), of New York City: I claim the method of patching a rifle ball, substantially as is set forth.

HINGES—R. Hart, of Washington county, Ohio, assignor to T. F. Hall, of Marietta, Ohio: I claim the employment of the shifting yoke, y, and in combination therewith of the spring, s, constructed, arranged and operating substantially in the manner and for the purpose set forth.

I also claim the combination of the hook or part, k, having a salient angle, a, constructed and arranged substantially as above set forth, with the inclined plane for closing and opening gates and doors

BUREAU BEDSTEAD—Francis Hoffman (assignor to himself and John Muzell), of New York City, I am aware that bureau bedsteads have been previously constructed, the bottom being so arranged as to fold vertically, occupying considerable room within the box and rendering it difficult to place the bed clothes in and remove them from the box, but so far as I am aware none have been devised to fold horizontally and occupy such a small space within the box, so that when folded no obstruction will be offered to the space above the bottom and the open space by means of the lid, c, rendered perfectly accessible for the stowing away of the bed or mattress and all necessary bed clothing. I do not claim therefore, broadly, and irrespective of construction, a folding bed bottom in connection with a box, so that the former, when the device is not in use, may be folded within the latter, and when designed for use withdrawn from it.

But I claim as an improved article of manufacture, a bureau bedstead, in which the bed bottom, B, is hinged so as to fold and expand horizontally when opened or closed, as shown and described.

[This invention relates to an improvement in that class of folding bedsteads which, when in a folded or compact form, are enclosed within boxes constructed to imitate bureaus and similar pieces of furniture, The invention consists in constructing the bed bottom in sections, and connecting or jointing the sections together in such a manner that the bottom may be folded together horizontally within the box, and occupy but a comparatively small portion of the space therein, leaving abundant room to receive the bed or mattress and all necessary bed-clothing.]

COMPOSITIONS FOR ROOFING—Josee Johnson (assignor to J. Ditto & Co), of New York City: I claim the use of mica for roofing, covering the sides of buildings and boat decks, as set forth and described.

WATER MOTORS—Caleb Rider, of Plymouth, Mass., assignor to G. T. McLauthlan, of Boston, Mass.: I claim the union or combination of the following elements or features, viz.:—

First, Making the inlet aperture of the tub, and the outlet apertures of the wheel of the same aggregate area.

Second, Forming the buckets of two planes or curves, the lower one making an angle of 26°, or thereabouts, with the plane of rotation of the wheel, and 90°, with the float or upper portion of the bucket.

Third, Making the tub circular and of sufficient hight and diameter to allow free action of the water therein, and causing the water to enter from the flume on a tangent thereto, whereby the inlet current is relieved from immediate and direct contact against the floats and buckets of the wheel, and caused to spend its force upon the waters already accumulated in the tub and through that upon all the floats and buckets of the wheel itself, the whole forming a water motor, arranged and operating substantially as described.

SEWING MACHINES—A. W. Sangster (assignor to V. M. Rice, Joel Thayer, James Sangster and Eliza Remmington), of Buffalo, N. Y.: I claim the combination of the cam or wheel, H, provided with one or more projections on its periphery, with the adjustable footpiece, G, or its equivalent, for feeding the cloth and and regulating the length of stitch in the manner described, and without the use of an intermediate feed piece.

FORMING BATS FOR FELT CLOTH—M. D. Whipple, of Charlestown, Mass., assignor to A. B. Ely, of Boston, Mass.: I claim, first, Shortening the staple in the manner and for the purpose substantially as set forth, previous to forming the bat.

Second, I claim the combination of the draw rolls, 1 and 2, with a brush cylinder, B, a doffer, C, and a suitable device upon which to form the bat, operating in the manner substantially as described for the purpose specified.

MACHINERY FOR FULLING CLOTH IN THE PIECE—M. D. Whipple, of Charlestown, Mass., assignor to A. B. Ely, of Boston, Mass.: In the described machine, I have spoken of four rolls, but I do not confine myself to this number, as three or more may be used.

I am aware that continuously revolving rolls have been employed in machines for felting hat bodies and other single articles, but such rolls would manifestly not answer in machines for felting a continuous piece of cloth, for if the latter were run through lengthwise as in some fulling machines an even cloth could not be made, and if the goods were wound upon a beam or roll, and submitted to the action of such revolving roll, it would either be wound tight upon the roll, or else entirely unwound therefrom, and in either case the felting would be impracticable. I do not therefore claim such continuously revolving rolls.

But I claim fulling or felting cloth in the piece by the action of rollers revolved alternately in one direction and the other, when the cloth is wound loosely on a spool, in the manner substantially as set forth.

MACHINERY FOR COMBING COTTON—M. D. Whipple, of Charlestown, Mass., assignor to A. B. Ely, of Newton, Mass.: I claim, first, The vibratory elastic feed rolls and permanent knife edge for holding the staple, as set forth.

Second, I claim the combination of a feed for introducing the material into the machine, the vibrating card, a', and nippers, and the stationary cards, t, and b', operating in the manner substantially as described.

RE-ISSUES.

VENTILATING ATTACHMENT TO BE APPLIED TO PUMPS—G. C. King (assignee of C. N. Lewis), of Seneca Falls, N. Y. Dated Nov. 17, 1857: I claim the arrangement and combination of the perforated base, D, cap and perforated tube, or other equivalents, with the pump barrel, as set forth, whereby the ventilator becomes attached to and forms a part of the pump, all as specified.

ELLIPTIC CUSHION FOR RAILROAD CARS—R. Jones, of York, Pa. Dated April 27, 1858: I claim, first, The local relation and mode of application of the semi-elliptic buffer to any and all cars wherever applied, in such manner as is represented by the letters, and for the purposes set farth.

Secoud, The combination and arrangement of the elliptic cushion for easing off collisions as described and arranged in every part thereof, in the framework, as represented by the letters, and operating substantially in such manner, and wherever applied to cars, as described and for the purpose set forth.

ADDITIONAL IMPROVEMENT.

METALLIC HOOPS FOR FASTENING COTTON BALES—James R. Speer, of Pittsburg, Pa. Dated Dec. 1, 1857: I claim as an improvement on my improved clasp of March 23, 1858, the use of a clasp for metallic bands, constructed as described, having a single aperture only for the insertion of the hooked ends of the band, the plate of iron of which it is formed being bent across the aperture, so as to present a sufficient opening for the ready insertion of the hooked ends of the bands in the manner described.

DESIGN.

CAST METAL TABLETS—Ezra Clark, of Portland, Me., assignor to Seth Clark of Westbrook, Me.

A CARD TO INVENTORS AND PATENTEES.

INVENTORS who have made improvements upon which they desire to procure Letters Patent, will do well to bear in mind that the Proprietors of the SCIENTIFIC AMERICAN have had upwards of thirteen years' experience in the examination of inventions, and during this time have unquestionably had more cases brought under their immediate notice than any other Patent Agency in the United States. It would be absurd to suppose that this extended experience did not afford them unparalleled facilities for the rapid and successful prosecution of this department of professional business. Messrs. Munn & Co. have made *thousands* of personal examinations at the United States Patent Office into novelty of inventions, and are familiar with the law, the rules and the regulations that govern the examination of cases, and are having daily intercourse with the Honorable Commissioner of Patents and the Examiners. Messrs. Munn & Co. have, during the last few years, successfully prosecuted hundreds of rejected cases, not for their own clients merely, but for agents of limited experience, whose offices are remote from that great storehouse of American genius, the United States Patent Office. They venture the assertion that, possessing such advantages and facilities as they do, no other Patent Agency in the United States can offer equal inducements to the worthy inventors of this country. In proof of the unparalleled amount of business transacted through the Scientific American Patent Agency, it is only necessary to refer to the letter of the Hon. Charles Mason, the late respected Commissioner of Patents, published below, and to the still more significant fact that nearly ONE THOUSAND PATENTS were issued, during the past year, to inventors whose cases were prepared and prosecuted through the Scientific American Patent Office.

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If an inventor wishes to procure patents in Great Britain, France, Belgium, Austria, Russia, Prussia, Spain, Holland or any other foreign country where patent laws exist, Messrs. Munn & Co., through their old established agencies in London, Paris and Brussels, can attend to it with great dispatch, and will, upon application, furnish all needful information, either in person at their offices in New York and Washington, or by letter. Inventors should remember that Munn & Co.'s office in Washington is not a *mere* "Agency," in which inventions are exposed to the view of *outside* parties, but it is a Branch Establishment, managed by Messrs. Munn & Co., and their confidential clerks.

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Inventors who wish to personally consult with Messrs. Munn & Co. can freely do so, and receive promptly all needful advice, free of charge, and their letters will be treated as confidential.

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" " Paris, 29 Boulevard St. Martin.
" " Brussels, 26 Rue des Eperonniers

The annexed letter from the late Commissioner of Patents we commend to the perusal of all persons interested in obtaining patents:—

MESSRS. MUNN & CO.—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill, and fidelity to the interests of your employers.

Yours, very truly, CHAS. MASON.

Communications and remittances should be addressed to MUNN & COMPANY
No. 128 Fulton street, New York.

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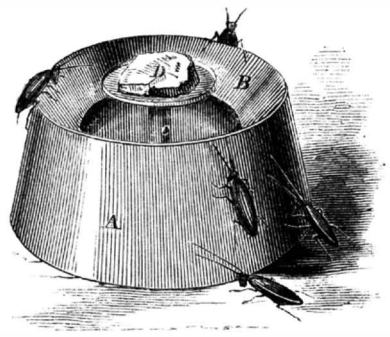
New Inventions.

Improved Roach Trap.

It is a great pity that roaches will not behave themselves better during the nocturnal hours, because if they did, their lives might be spared, but as it is, every careful and cleanly housekeeper feels herself bound to do her utmost toward their extermination. Inventors, gallant men as they are, of course provide them with the artillery, and our engraving represents a piece which is capable of doing very great service in the war of woman *vs.* roach. We need only mention that two quarts of roaches have been caught in a single night by one of these traps.



A is the body of the trap, made of metal or other suitable material, the outside of which is coated with sand, to give it a roughness, so that the roaches can climb up with facility. On the top of the body of the trap is an annular ring, B, made of smooth metal. This ring is inclined inward and downward toward the center of the trap, and must not be made fast to the body of the trap, as it is necessary to detach it when the trap requires to be emptied.

In the center of the trap is an upright stem, C, which supports the bait pan, D; this pan must be also made loose, so as to be lifted off when the trap is to be emptied, otherwise the bait would be spilled over the floor or into the trap. This bait pan must be placed nearly on a level with the top of the trap, so that when the roaches ascend the outside of the trap they are enabled to see or smell the bait in the pan, in doing which they descend the inclined annular ring, and drop off the edge into the body of the trap. The pan, D, is baited with sugar, molasses, or other suitable bait; and it will be perceived that the roaches are caught before they get to the bait, which remains to entice others to follow, while it is out of the reach of those that are already in the trap.

This trap is the invention of A. N. Shell, who has assigned his invention to W. L. Wood and T. N. Shell, of Richmond, Va., who may be addressed for further information. It was patented October 5, 1858.

New Force Pump.

When Torricelli first discovered the theory of the common pump, he was not aware of the numerous applications which would be made of his discovery, one of the most striking results being the extended use of the force pump, and gradual abandonment in many instances of the old suction pump as it is improperly termed. As it is well known, a common suction pump will only raise water about 33 feet, and as it is oftener necessary than not, to raise water from a well considerably higher than this, a force pump has to be used. The subject of our illustrations is a new force pump, which is simple, efficient and compact—the invention of Jacob O. Joyce, of Cincinnati, Ohio—requiring no stuffing-box, that from the difficulty of keeping it thoroughly packed and preventing it from leaking render the pumps using it so objectionable, for as soon as the vacuum is destroyed, the pump becomes useless until overhauled and repacked. Upon ceasing to work the handle, the water leaves this pump, thus preventing freezing in winter and the water becoming stale in summer. It gives all the agitation necessary to keep the water in the cistern pure, and being placed in the water does not rust, the valves are always wet and will not decay, and this pump never requires priming.

Fig. 1 is a perspective view of the pump fixed in a well or cistern. A is the case, and B the handle of the pump pivoted to the air chamber, C at *a*. To the nozzle, D, may be attached a flexible tube and nozzle, E E′, of any length desired. To the handle, B, at equal distances from the point, *a*, are attached by pins, *b*, two rods, F, that pass down to the bottom of the well, their other ends being connected with the arm, J, that operates by means of the shaft, I (Fig. 2), the semi-circular piston rods, K, that work in the pumps H. G′ and G is the water exit of the pump, and the tube that the water is sent up to the air chamber, this the inventor prefers to make of galvanized iron with a nice soldered joint where two pieces have to be connected. The pump, H, is cast in two halves, the interior surfaces of which are ground on an emery wheel until when put together they form a perfect curved cylinder, and the two halves have a groove in their edges which is filled with soft gutta percha, so that when they are screwed together, they are perfectly water and air tight.

JOYCE'S IMPROVED FORCE PUMP.

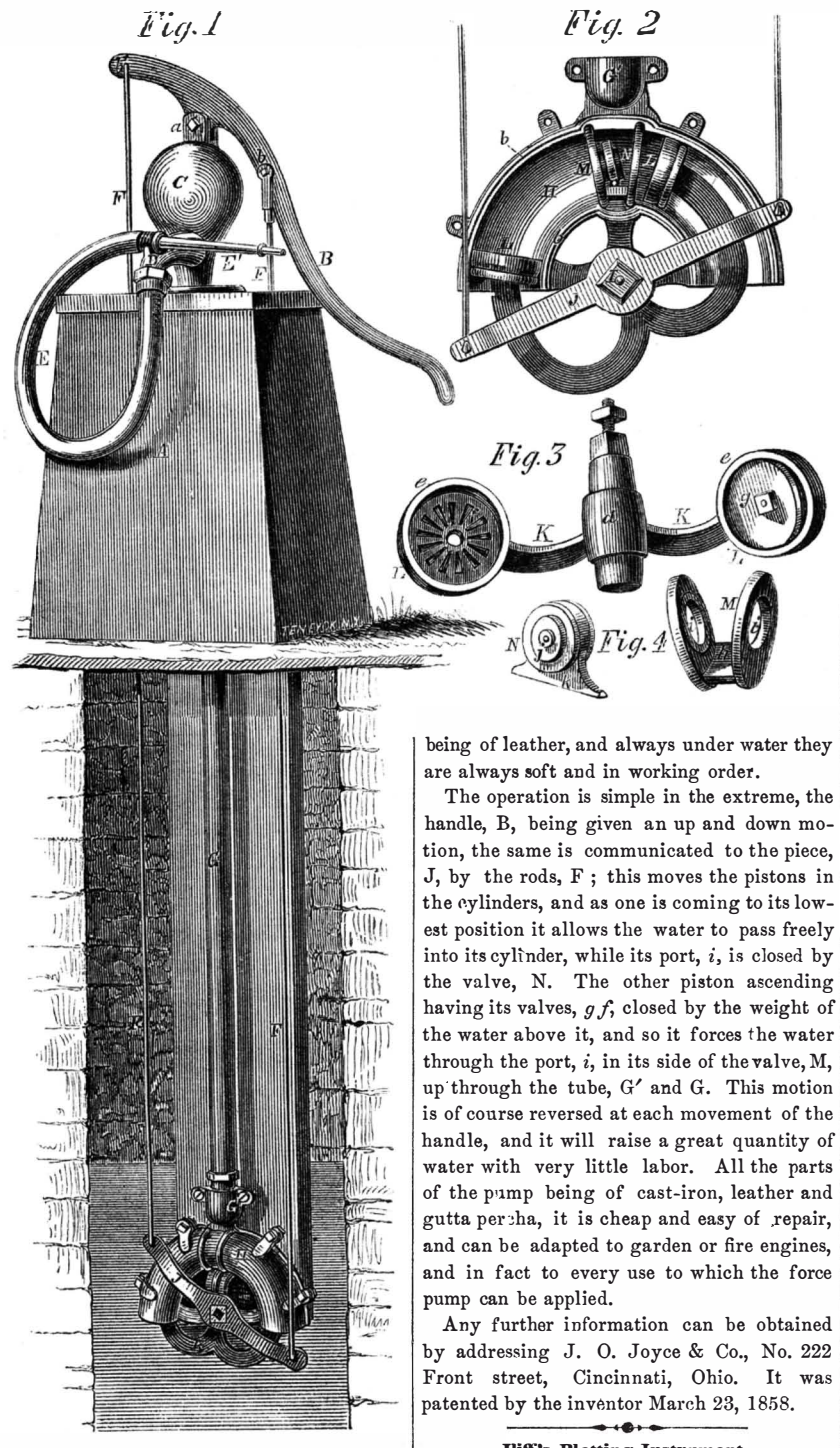
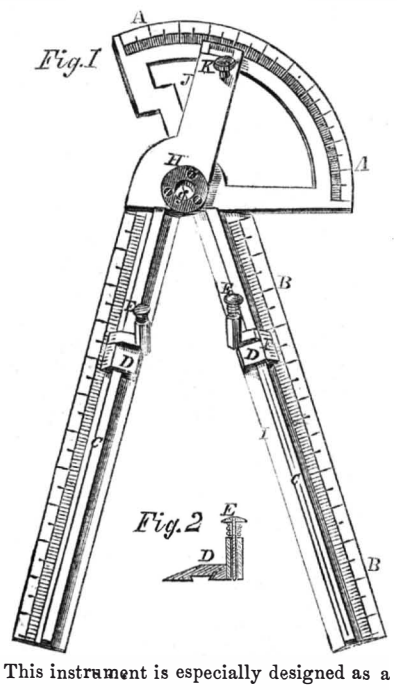


Fig. 2 shows the pump, with one-half removed. L are the two pistons, seen better in Fig. 3, supported on and moved by the arms, K, cast with the shaft, I, of which *d* is the hub. The pistons are formed of a leather cup, *e*, in which a register valve, *f*, is free to work, and this is covered with a leather cap plate, *g*. In the top part of the pump, also packed with gutta percha, is placed the valve seat, M, having two ports, *i i*, and a small bed, *h*; on this bed rocks the valve, N, resting on its lower edge, *k*, the faces, *j*, being formed of leather riveted to the casting. These parts are seen separately in Fig. 4, All the valves being of leather, and always under water they are always soft and in working order.

The operation is simple in the extreme, the handle, B, being given an up and down motion, the same is communicated to the piece, J, by the rods, F; this moves the pistons in the cylinders, and as one is coming to its lowest position it allows the water to pass freely into its cylinder, while its port, *i*, is closed by the valve, N. The other piston ascending having its valves, *g f*, closed by the weight of the water above it, and so it forces the water through the port, *i*, in its side of the valve, M, up through the tube, G′ and G. This motion is of course reversed at each movement of the handle, and it will raise a great quantity of water with very little labor. All the parts of the pump being of cast-iron, leather and gutta percha, it is cheap and easy of repair, and can be adapted to garden or fire engines, and in fact to every use to which the force pump can be applied.

Any further information can be obtained by addressing J. O. Joyce & Co., No. 222 Front street, Cincinnati, Ohio. It was patented by the inventor March 23, 1858.

Iliff's Plotting Instrument.



This instrument is especially designed as a pocket companion for the surveyor, so that while taking his observations and measurements he may have an assistant, by whose means he will quickly be able to produce a plot with all the meridians, angles, &c. As it combines in one simple instrument the protractor, sector, scale, parallel rule, and moving meridian line, it is useful to all who are in the habit of using such instruments. The whole is made of German silver, or some similar metal, and it is small and compact.

A is a protractor, properly graduated into the angles and minutes, and forming part of the leg, B. The other leg, J, is attached to it by an eyelet, H, so that it can move upon it as an axis, the point, *g*, being the center of the instrument. This leg, J, has a vernier on its end, that reads to the two-hundredth of an inch, and J can be secured at any point by the clamp and screw, K. On each leg is an angular piece, C, that serves as a guide for the piece, D, carrying the spring point, E, which has a rebate in its base (seen in the section, Fig. 2), that fits on to C. The leg and D are both divided, so that any distance can be read off and marked on the paper by pressing on E, the spring bringing the point up. In making a plot on paper, the meridian is first drawn by either leg, and the other moved until the angle is got on the protractor, the legs secured by K, and the distance being pricked off by D and E, the line is drawn of the required length and at the proper angle; another meridian then being made, the same process is repeated until the plot is perfectly drawn to the required scale.

By thus taking the course and distance together, the liability to error is lessened, and with this device the area of fields can be calculated, let its sides be ever so numerous, in a very short time. The "traverse tables" and double the meridian distances, are dispensed with, by simply dividing the plot into triangles, to which the accurate scales of this instrument being applied, the unknown parts are readily determined. The surveyor can also balance his eastings, westings, northings and southings, thereby correcting his field operations, and properly apportion his errors.

It is the invention of C. R. Iliff, of Falmouth, Ky., and was patented January 12th, 1858. They can be obtained from James Prentice, No. 1 Chambers st., New York, and James Foster, corner of Fifth and Race sts., Cincinnati, Ohio. Further information can be had by addressing A. G. Gower, Covington, Ky.

Curing Hams—Recipe No. 2.

A correspondent—Mr. Wm. H. Bennett, of Warwick, R. I.—sends us the following description of a method practised with great success by him for several years in curing hams:—

He first takes the cask in which the hams are to be salted, and smokes it for half an hour over a low fire made with walnut chips. He then makes a pickle for two hundred pounds of ham by dissolving fourteen pounds of Turk's Island salt, half a pound of saltpeter, and two quarts of molasses in sufficient water to cover the meat when placed in the barrel. This pickle is skimmed while the salt is being dissolved at a scalding heat. When cooled down this brine is poured upon the hams in the barrel, and they are allowed to lay in it until they are salted. They are then lifted out, hung up to dry, and are afterwards rubbed over with a composition of fine salt, black and red pepper, and some ground cloves. When this operation is performed, they are sewed in bags, and hung up with shanks downwards. A dry, cool attic chamber is the best place to keep them. Hams thus preserved have a very excellent flavor, and do not require to go through the smoking process.

The simple smoking of the cask will have the effect of communicating a mild, smoky savor to the meat. Of this we are confident, because we have seen it done, and can endorse Mr. Bennett's experience in regard to this feature of the process. We believe his practice is a good one.

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Scientific American.

NEW YORK, NOVEMBER 6, 1858.

Tunneling through Mountains.

The method generally employed in boring long tunnels consists in first sinking several shafts along the line, then tunneling from both ends and in each of the shafts at the same time, by as many gangs of workmen. This method, by providing for a great number of operators to execute the work, hastens its completion, and the short *run* of each gang in the tunnel admits of easy ventilation. Under a high mountain this system of tunneling is impossible, because shafts cannot be sunk, therefore a tunnel in such a situation can only be bored from two points at once—the termini at each side. On the Piedmont Railroad, now being constructed through the Alps, a long tunnel of several miles is required between Modane and Bardoneche. It will pass 6,000 feet below the summit, and, of course, the sinking of shafts was impracticable in such a case. By the common methods of tunneling, it has been calculated that it would require thirty-six years to complete the operations, and it was also held to be impossible, by known means, to ventilate the tunnel when it had attained to a great depth, owing principally to the great amount of blasting required, which would vitiate the atmosphere. Unless some new means were devised to overcome such difficulties, the execution of this great tunnel could and would not have been undertaken. By the ingenuity of three Sardinian engineers, Messrs. Sommeiller, Grattone, and Grandis, provision was made for surmounting all these obstacles. On the mountain, adjacent to the line, there was a large stream of water on a fall of sixty-five feet. This they have applied to operate a hydraulic motor, which condenses air in a reservoir to the pressure of 90 lbs. on the square inch; this is conducted in an extension tube into the tunnel, where it first operates machinery which drives the drills, then it escapes and supplies the miners with fresh air, thus performing two duties, namely, drilling and ventilating. By this machinery eighteen holes are bored in the same space required for six miners in drilling, and each hole is bored in one-twelfth of the time taken up by hand labor. When it is taken into consideration that three-fourths of the time in tunnelling is occupied in boring, the immense saving of time by these arrangements is obvious. With such original applications of condensed air to tunneling, it is calculated that this sub-Alpine tunnel will now be completed at a greatly reduced cost in six years—a very great difference from thirty-six, by the ordinary means of boring.

In this tunnel some peculiar phenomena of of temperature are witnessed. The common heat of the air, at such a depth, is over 100° Fah., too hot for the miners to work comfortably, but this is modified to a pleasant temperature—70° Fah.—by the condensed air which is fed into the machines. By the refrigerating effects of expansion, when this compressed air at 90 lbs. pressure escapes, it absorbs heat from the surrounding air and thus cools it down. This power of absorbing heat by expansion is so great that water placed close to the escape air valves is congealed into ice. A sufficient supply of fresh air is secured for the ventilation of this tunnel at its greatest depth. No less than 14,320 cubic yards of six atmospheres pressure can be furnished every twenty-four hours. The progress now making in excavating this tunnel from both sides is nineteen feet per day. When completed it will be one of the wonders of the world.

The use of condensed air as a motive and ventilating power for tunneling power should arrest the attention of engineers in every part of the world. On all mountains where deep and long tunnels are to be cut, there are usually high waterfalls, which can be applied to drive a simple turbine wheel, capable of condensing air in a reservoir by working pumps, and this air can be made to operate drilling machines, and also to ventilate the tunnel, as in the one described, The same use of water power and condensed air is applicable for mines in hilly regions. To our miners in the mountains of California, and those engineers who must at some future day tunnel through the Rocky Mountains, in constructing a Pacific railroad, the foregoing information should be treasured up and carried into practice when the favorable opportunities are presented. We live in an age of wonders, and the boy may now be living who will be called upon to undertake the work of letting daylight through the mountains between us and the Pacific coast.

Steam on Canals.—Steam Engines.

The subject of using steam on our canals is deservedly exciting much attention. Where practicable, it will cause a great saving of time and cost of transportation through those channels. A prize essay on canals and canal conveyance, by W. O'Brien, for which £100 premium was awarded, published by John Weale, 57 High Holborn, 1858, gives some interesting facts and statistics. In it, a comparative cost of horse and steam power on canals shows a saving of one-third of the expense by using steam, besides having an increase of power at command; and being self-dependent, the boat can go anywhere. There is also a saving of half of the time required for a trip, as almost any speed is attainable, on which account also the number of boats may be diminished one-half; additional saving may be made by towing, &c. It states that boats have been built for the Grand and Regent's Canal with two screws astern, one on each side of the rudder, revolving in opposite directions, and worked simultaneously by the same engine. These boats are said to be very good, and to steer well when going stern on. There may be less wear on the sides and bottom of a canal by the use of two small screws instead of one large one, yet a medium screw may give as much speed as is wanted without injuring the canal, and may be less expensive.

In the work above mentioned is a note to the author from H. Parish, Esq., of New York, as follow:—"My opinion is that the application of steam to canal navigation has been more successfully carried out in Sweden than elsewhere; the vessels are all screw steamers, and travel at the rate of nine to ten miles an hour, excepting where the canal is narrow, and they are obliged to go at half speed, to avoid washing the banks; the engines are small and compact; the cylinders are inclined, and rest upon a hollow bed plate, which is the condenser; the air pump and feed pump are worked either by eccentrics on the main shaft, or directly from the cross-head of the piston rod—the hand gear is on deck. This engine is almost universal in Sweden, and is well known, having obtained a medal at the great Paris Exhibition. The vessels convey from 150 to 200 tuns freight, and could tow several barges."

While they are making experiments with boats on the Erie Canal, would it not be well for some of our steam engine manufacturers so turn their attention to the preparation of engines suitable for general use, to combine economy in cost, in space, and in keeping in repair; to be simple in arrangement, and easy to be managed; and to be uniform in sizes and parts, so that any part could be replaced, and thus save cost in making or repairing. There must be a great demand for such engines when they begin to use steam on the Erie, and our other canals. The Delaware and Hudson Canal has more than a thousand boats on it; and they have made arrangements for a greatly increased production of coal the coming year and hereafter. Their boats being of uniform size would require engines which could have uniform parts. Having fuel at a cost almost nominal, they have every inducement at once to introduce steam, if practicable, which there is no reason to doubt.

Disease Charms—Mad Stones.

On page 19 of the present volume of the SCIENTIFIC AMERICAN, we briefly alluded to the notions entertained by many persons of the virtues of what are called "mad stones" in curing hydrophobia. Since then we have received a letter from Junius F. Maupin, editor of the *Whig* at Moorefield, Va., in which he states that there has been a "mad stone" in their family for seventy-five years, and that it has been the means of curing hundreds of persons during that period, as applied by his grandfather and father; and in no instance had it ever failed to effect a cure. He believes in the curative virtues of this stone as firmly as he does in his own existence, and says:—"I would not be afraid to venture my life that you may take the most violent case of a person poisoned with virus, and by the application of this stone, the poison will be abstracted in half an hour. This stone is about the size of a chestnut, and when applied to a wound caused either by a dog or snake-bite, it adheres to it like wax until it becomes saturated with the poison, when it drops off. When placed in a bowl among water, it imparts to the latter a greenish tinge." This "mad stone" is now in the possession of Jennings Maupin, of Marshall Mo. and we are informed that a great many persons of the highest respectability in Virginia will endorse his statements regarding its curative merits. We are well aware that many persons of respectability and intelligence have great confide nce in the virtues of such stones, but we have never had any confidence in them ourselves. If these stones act only upon the principle of absorbing the poison when applied to wounds, of course, the operation of cupping must be more effectual and rapid. But the poison of snake and dog bites seems to affect both the nervous system and the blood; therefore, to cure a person affected with hydrophobia, something more is required than the mere abstraction of the virus from the wound. The "mad stone" to effect a cure, must have the power of communicating its virtue through the whole system in two methods, namely, by neutralizing the chemical decomposition of the blood, and also by allaying the nervous or spasmodic action. When it is known, however, that smallpox may be communicated by the touch, hydrophobia by virus entering through a break in the skin, and fever by the air we inhale, it must be acknowledged that there are more things on earth than can be explained by man's philosophy. Cures, therefore, in a great many instances, may be effected by means as simple as diseases are communicated.

Hydrophobia charms, in the form of "mad stones," have been known and used from time immemorial. Most of them have come from Asia, together with the traditions of their powers. During the Holy Wars several of these stones were brought to Europe from Syria, having been taken from the Saracens by the Crusaders. One of these has been in the possession of the noble family of Lockhart, in Great Britain, for over six hundred years. It was obtained by one of the knights of this name from a Saracen lady of rank, as a ransom for her husband whom the island warrior had taken prisoner in battle. For several generations during the dark ages, this "mad stone" had a high and very exteusive reputation for curing hydrophobia, but its fame has waned before the light of modern knowledge, and it is now held to be nothing more than a relic of a dark age.

It is rumored that Commissioner Holt is about to take his seat in the President's Cabinet. He would ably fill any Cabinet appointment, but we hope he will not leave the Patent Office. His administration is in general very satisfactory, and we should be very sorry to have him leave his present post of duty.

Some Results of Acclimation.

One of the great benefits which all the discoveries and inventions of new places, and a facilitated mode of transport and travel confer upon mankind is, the exportation and distribution of the products of different climates, the one to the other. Thus, in the East Indies, Spanish wine is cooled by American ice, and in England, Jersey apples are cooked with West India sugar. As we learn the flavor and use of the products of foreign climes, we naturally wish to possess them, but to make any of them, whether animal or vegetable. able to live in what is, to them, a foreign climate, they have to be acclimatized. This is best done by a gradual change; and although the imported specimen is often of little use, yet its seed or offspring can be made useful or eatable as the case may be. Thus, the camels which have been imported to Texas, are not capable of so much labor in that climate as their offspring which are born and matured there will be. There is in France a society which especially pays attention to this subject, and some of its results we will now enumerate. The "yak," or Thibet bull, has been introduced by them; and in 1835 they distributed several thousand bulbs of the yam, which now in France promises to rival the potato. They have encouraged the growth of the Sorgho, and in some parts of the country it is now the staple food of the cattle, leaving the beets to be made into sugar. The loza, a kind of buckthorn, from which is extracted the beautiful Chinese green, has been acclimated by their endeavors; and the Angora goat, so long noted for the fineness of its wool, is now a permanent resident of the empire. Not only has this society succeeded in introducing a species of silkworm which feeds on the castor oil plant, but it has modified its food, and substituted the leaf of the common teasel for the former, which is difficult to cultivate in that country. With a view of restoring the fine quality of the potato, which, by too extensive cultivation in Europe, and by disease, has deteriorated, the society has imported a large number of roots taken from the Corderillas. A plot of land has been granted to them by the city of Paris, which is to be made into a zoological and botanic garden, for the acclimation and propagating of foreign animals and vegetables that may produce articles either of luxury or utility. This is putting our knowledge of geography and steam to good use, and studying in the most practical way the great problems of social science.

Sewing Machine Patent Case.

On page 13 of the present volume of the SCIENTIFIC AMERICAN, we noticed the suits which had been entered at New Haven, Conn., by Wheeler & Wilson against other parties for infringing their patent. We pointed out the peculiarities of the case, stating that the defendants contended that the patent upon which the suits were entered must be void, because it was a re-issued patent, obtained without the consent of a party who owned a portion of the original one, and that only one patent could exist for the same invention. As this was a novel and intricate question of law, much argument was heard from counsel on both sides, and the Court—Judges Nelson and Ingersoll—deliberated on their decision until the 21st. ult. It has been given in favor of the validity of the reissued patent, but we understand it will be carried up to the United States Supreme Court for final adjudication.

New Level.

We have received from H. Chapin of Union Factory, Pine Meadow, Conn. a very handsome level, suitable for all purposes to which this instrument can be applied. It contains three bulbs so arranged that horizontal, vertical or angular levels can be taken. The bulb for taking levels of angles being placed in a divided adjustable circle, in order that the angle can be read off, or any required angle obtained in the work. It is a very valuable instrument, we mean in its utility, not price.

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Iron Girders.—No. 2.

MESSRS. EDITORS—It has been conjectured by writers on beams (professed civil engineers) that the forces produced within structures of this kind by loads placed upon them, act in all possible directions; but the opinion seems to be most general now that they act in horizontal directions, compressively in the upper parts, and tensively in the lower parts; that between these two opposing forces there is a line quite free from strains, and therefore they call it a "neutral axis." It seems strange that such notions should be entertained; but Barlow, who has written largely on this subject, and many other writers of distinction, and the engineers in charge of our government works, give this theory their sanction, by an exclusive use of beams and girders formed and made in accordance with it. That is, they are rectangular, and of very nearly uniform cross-section. The upper and lower parts or chords made to sustain the compressive and tensive forces are large and broad, and parallel to each other from end to end, and in the rolled beams there is but a slight connection between these chords, consisting of a thin vertical web, its thickness often less than half the thickness of the chords, and this web is of uniform width, apparently for the purpose of keeping every part of the chords as far apart as possible. These beams are constructed as if there were no kind of relation existing between the forces that act in opposite directions in the upper and lower chords, and as if their duties were entirely distinct, and so divided by the neutral axis that they must not unite, or even approach towards each other. The side plate of the rectangular tubular girders are also made comparatively thin for similar reasons, and for the same purposes as the vertical webs in the rolled beams or girders, though the upper chords of tubular girders have, in a few instances, been slightly cambered.

If further proof is wanted to sustain this interpretation of the meaning of the theory of a neutral axis and of parallel forces, it may be found in the circulars published by the makers of most of the girders and beams used by our government. In forming girders 18 inches deep out of two 9-inch T beams of uniform cross-section, by uniting their stems by means of splice plates riveted along the sides and over the junction of the stems, which line is at the middle of the depth of the girder, and extends from end to end, and is parallel with the direction of the chords, they say: "The rivet holes are thus all made near the neutral axis of the beam, and none of the metal cut away in the part of the section most effective for strength."

They thus show conclusively that they suppose the neutral axis to extend quite through the entire length of the structure. And as they make the cross-section of their beams and girders uniform throughout the entire length, and the parts parallel and of equal length, they suppose that the forces do not act in these directions only, and with equal intensity at all points; and they also suppose that their action is wholly confined within the length of the beam; for, as it is well known that a beam bending under a load becomes shorter, horizontally, in consequence of its ends being drawn towards each other, the forces cannot produce strains outside or beyond the ends; and as the cross-section of the beam is made uniform, and of equal size throughout, it is but fair to conclude that it is made so because they suppose the forces act with equal intensity at all points within its length. This theory will not admit of a supposition that the forces can act downward, in the manner of pressure, for then they would act upon the neutral axis, which is supposed to be quite free from strain; nor is the form of the web well calculated to sustain vertical pressure or oblique strains. The provision for the pressure, then, according to this theory, is wholly confined to horizontal directions, and is bounded by the ends of the beam and the neutral axis, as if a force acting vertically, such as a load on a beam, could be sustained and held in equilibrio by another force or forces that act only in horizontal directions, or at right angles to the direction of the first force. That learned philosophical (?) writers should fall into so bald an error, and that mathematical engineers should try numerous experiments to prove this theory right, seems strange indeed. This theory is simply preposterous; and structures formed in accordance with it are sadly defective, as results already alluded to prove most conclusively.

The pressure of a load on the upper side of a beam, must extend downward through its entire depth, producing vertical pressures on every possible horizontal line or plane within its depth, equal to the weight of the load, and finally result in the pressures on the bearings under its ends. This simple statement, so obviously true, ought to be sufficient to dispose of the absurd notion of a neutral axis. If, however, it should fail to convince, let the doubting divide a beam horizontally in two parts in any line where they suppose the neutral axis to be situated. Then if they will place their hands between the upper and lower parts thus divided, they will become *painfully* impressed with a conviction that the supposed neutral line is not free from pressure.

Divesting this question of all mystification, and considering it in this direct way, it will become plain that every horizontal line or plane within the depth of a beam (or any similar structure) must not only bear a vertical pressure equal to the weight of the load and such portion of the beam as may be above the line, but it must also bear a full proportion of oblique strains, and consequently the theory of a neutral axis can be nothing more than a myth; and it will also become plain that the forces act horizontally only at the middle of the upper chord (compressively), and (tensively) in the lower chord through its entire length. At the extreme ends of the upper chord there is no strain in any direction whatever, therefore these parts of rectangular beams contain a large proportion of waste material. While the vertical webs are greatly deficient in strength, not for want of material, but because its distribution is bad, and the forms unsuited to their important duties—being deficient in both vertical and lateral strength—they become distorted, and cause the lateral deflection that has so confounded those who act upon the theory of a neutral axis and horizontal forces.

BENJAMIN SEVERSON.

Baltimore, Md., October, 1858.

Uses of Soluble Glass.

MESSRS. EDITORS—This substance, which is a silicate of soda, was discovered in 1825 by Professor Fuchs, of Munich, Bavaria, and it created considerable sensation at the time. Its power of resisting the action of fire was early demonstrated, in the presence of the King, and several eminent scientific gentlemen. A small hut was prepared, having its boards saturated with the silicate, and it resisted all attempts to destroy it by fire. It was not, however, until within a few years past that its merits as a protective coating, and as a vehicle in the painting and coloring arts, came to be generally appreciated. Liebig was really the first chemist who successfully directed public attention to its versatile qualities, and since then its use has been extending. At the Paris Exhibition of Industry, Kuhlman, a distinguished French chemist, exhibited its application as a substitute for linseed oil in the mixing of paints, and as a transparent surface varnish for wood, brick, stone, and metals. As a substitute for linseed oil, it is ground up with the paints, has no offensive smell, soon dries, is more durable and purer in color, and at the same time is not above half the price. Chalk, whitening, baryta, lampblack, ultramarine, indian red, terra sienna, and various other pigments, mix readily with the soluble glass, as does *blanc fixe*—a precipitated sulphur of baryta, a favorite brilliant white pigment now used in Europe. Fresco and stereo-chromic painting are now executed in soluble glass as a vehicle, and the effect is brilliant. It is now employed for mixing with some colors as a substitute for gum and starch, and as a detergent in place of ammoniacal substances; also for washing, as a substitute for soap. It is employed for this purpose in the state prison at Spandau, in Prussia. It has also been used for mixing with the pigments or colors in oil-cloth printing, and for white military belts, when combined with Paris white. It is also a good varnish for paintings, and such documents as are designed for long preservation; also for all kinds of metals, to preserve their polish, and to prevent them from oxydizing. The writer of this communication coated several thousand cannon balls with it in the Brooklyn Navy Yard, in 1832, and they remained for several years unaffected by the atmosphere. By coating the walls of cellars or underground apartments with it, they are preserved from dampness; and it protects rails, bridges, and soft sandstone surfaces from being destroyed by the action of rains and the atmosphere. When mixed with marble dust and slacked lime it forms a hard cement, and with ground fluorspar it will make blocks nearly as hard as iron. A cement composed of equal parts of soluble glass, white clay in powder, pumice stone, and ten parts of sand, becomes very hard, and can scarcely be surpassed for making roofing.

As a protective against fires, soluble glass, perhaps, holds the most important position, especially in our country, where we have so many wooden structures, and because we suffer such immense losses annually by fires. On Tuesday, the 12th ult., the railroad bridge at Hamilton, C. W., was destroyed by fire from a spark of the locomotive. Had it been coated with soluble glass, at an expense of only a few dollars (fifty cents per gallon for the liquid) it would have been standing yet. In Vol. XII., page 165, SCIENTIFIC AMERICAN, some experiments are described in the Woolwich marshes, England, on a wooden hut, in order to test its fire-preventive properties; these were very successful. The surface of the timber was merely washed with a thin coating of the silicate, yet although the planks were submitted to a very high heat, in fact, a roasting temperature, they did not blaze, they merely singed away, and when the fire was put out they presented a charred appearance. As a fire preventive for steamers and all wooden structures—to which it may be applied as a coating—it certainly would insure greater safety of life and property. F.

[The above communication, from a practical chemist, showing forth the valuable properties of soluble glass, will be found very instructive, and no doubt it will attract attention.—EDS.

Platinum.

The heaviest and the lightest substances with which we are acquainted possess the properties which chemists recognize as "metallic." The lightest substance we know is hydrogen and although a gas is yet presumed with good reason, to be a volatile metal. Platinum is remarkable as being the heaviest of all the elements which constitute the world. If we take a certain bulk of lead weighing one pound, and the same bulk of platinum, we shall find that the latter will weigh more than one pound and three quarters. It is now about a hundred years since Europeans became acquainted with platinum through Mr. Wood, Assaymaster of Jamaica. The sandy beds of the rivers which have their rise in that portion of the Andes which separates the Atlantic (near the Carribean Sea) from the Pacific Ocean, yield gold, silver, platinum, and other metals. Near Carthagena, a city of South America, in the republic of New Granada, is a famous mine called Santa Fe. From this place most of the platinum of commerce is procured, but it is also found in the Brazils, Mexico, St. Domingo, and on the eastern declivity of the Ural mountains in Russia. It is also found in Borneo, and will probably be discovered in Australia, if proper search be made for it. By some extraordinary process, the laboratorian chemists can liquify this metal; but it cannot be melted by the strongest blast-furnace, nor by any of the appliances in ordinary use by metal-workers; hence it is said to be infusible; and did it not possess that property called welding, that is of uniting or adhering together when squeezed or hammered at a white heat, it would be almost useless. As however it can be welded, various useful vessels are made of it; and thus we find that it has qualities peculiar to itself. No single acid will dissolve it; hence its very refractory nature render it invaluable to philosophers. In a platinum crucible they can submit other substances to experiments either with fire or chemicals without any fear of modification from the containing vessel. Magic, according to the lexicographers, is "the secret workings of natural powers." Such being the case, platinum is truly magical, for it possesses a property or power, the secret of which we are unable at present to define, which singular quality has been brought into practical use by the manufacturing perfumers. At several of the perfumery factors' ware-houses may be seen what they call the "Philosophical Incense Lamp," which is a marvelous realization of "Aladdin's Wonderful Lamp," so graphically described in the Arabian Nights' Entertainment. This lamp once ignited will never go out unless purposely extinguished, provided of course that there be material to consume. This property is due to a little platinum ball placed in the wick, which once being made red-hot with the flame will remain incandescent to the end of time. It is this property which is a still unexplained secret of nature. The incense lamps are trimmed with sweet-smelling spirit, and the red-hot platinnm causes this to evaporate, thus perpetually flinging fragrance around. Some few years ago platinum was used in Russia as money, and stamped as coin of the realm. Why it was abandoned we are unable to learn. Should there be any future scarcity of gold or silver, it is probable that platinum will again be used as a medium of exchange. If a stream of water, passing steadily through a pipe of a certain size, were suddenly caused to flow through another pipe joined to it of half the size, nothing more would be noticed than that the water in the smaller pipe would flow with increased velocity; but if a current of electricity, while passing along a copper wire, be made to pass over a smaller one, or link of platinum wire, then a marvellous effect takes place; the platinum becomes red-hot! In this way—for igniting gunpowder at a distance, and blasting rocks, engineers find platinum of the greatest service.

SEPTIMUS PIESSE.

AMERICAN TRADE WITH RUSSIA.—Our Minister to Russia, Mr. Pickens, writes that the increasing settlements and trade in California, and on the Pacific, are bringing us into intercourse with Russian possessions on the Amour River and the Asiatic coast, as well as with their possessions in America. The trade of the Amour River is immense—something like $30,000,000 a year, and growing rapidly. American ships at Cronstadt are more numerous than those of any other nation except Great Britain.—Thirteen ships arrived there this season direct from Charleston and New Orleans loaded with cotton, without having touched at Liverpool at all, as has heretofore been the case. The direct trade must increase every year. Manufactures in cotton are increasing immensely about Moscow; and one may see loads of cotton there every day in the streets, passing to the railroad for that point.—*Baltimore Daily Exchange*

A FRESH importation of eighty camels at New Orleans is announced by the *Picayune*. They are to be sent to Texas, to be employed by government officials in traversing the wilderness between California and Texas.

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Notes and Queries

*** Persons who write to us, expecting replies through this column, and those who may desire to make contributions to it of brief interesting facts, must always observe the strict rule, viz., to furnish their names, otherwise we cannot place confidence in their communications.

D. S. & F., of Ohio.—In our last number you will find an answer to your query in the article on "Telegraph Conductors." It is there stated that a second wire for the return current would not be of any benefit to the Atlantic Cable.

C. C., of Pa.—You can safely remit money to Messrs. Wiley & Halstead. They are very reliable parties, and keep a good assortment of books of all kinds.

A. W., of Mass.—To obtain the same amount of power on a low as on a high waterfall, a relatively greater amount of water must be employed. As there is always some loss by leakage, it is considered by many that the wheel which is required to pass the less amount of water through it has an advantage, and that high falls are thus proportionally the most efficient.

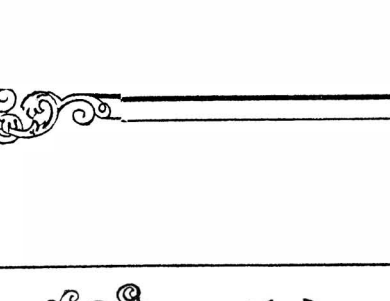
C. S. G., of N. Y.—We consider it impracticable to propel a balloon by means of an Ericsson engine, with a propeller built upon the principle of a windmill. You had better not bother your brain with any such scheme.

A Large Brewery.—Allsopp & Sons' new brewery, now in course of construction at Burton-on-Trent, England, will be the largest in the world, and is calculated to brew 1,440,000 bushels of malt per annum, the gross value of which will be $10,000,000. The fitting-up of the working plant and brewery apparatus is being conducted on an entirely novel and ingenious principle.

J. C., of Pa.—You may form some idea of the magnitude of the British iron and steel trade when you take into account that from 1621 to 1857, over one thousand patents were granted for alleged improvements in this branch. Sterling, Mushet, Bessemer, and Nasmyth are among the most prominent inventors.

G. B. S., of C. E.—Your communication will receive attention in our next issue.

R. D. A., of Pa.—You ask "if a shaft, A, be making 200 revolutions per minute, and B be a plane metal plate 20 inches in diameter, fixed on and revolving with the shaft, C being a plate of similar diameter not revolving with the shaft, and D being another plate movable towards B, and placed on a square portion of the shaft, what amount of pressure applied to D will be able to lift a weight, W, of 200 or 400 pounds?" The friction of your plates depends upon the material used, and upon the condition of their surfaces, but it is always in direct ratio to the power with which the surfaces of the plates are forced against each other. The co-efficient of friction between cast iron sliding on cast iron when the surfaces are dry, is generally assumed to be ·15 to ·16, that is to say, their surfaces must be forced together with a force of 100 pounds in order to be able to sustain 15 pounds; and as you employ two plates, you will be able to raise 30 pounds. To elevate 300 pounds by this means, you must bring the plates, B and D, against C, with a force of 1,000 pounds. The diameter of the plates makes no difference when the friction takes place near the periphery.



Yankee Enterprise.—An American schooner called the *Harvest*, from Lake Erie, arrived at Cowes, England, on the 9th of September, with a cargo of carpet sweepers, walking sticks, and fancy woods. Good for Brother Jonathan.

The librarian of the University of Michigan, Ann Arbor, Mich., wishes us to ask some of our readers to send him by mail, No. 38, Vol. XI., Scientific American.

N. B. H., of Ohio.—The combination of two well-known devices to produce a useful result is patentable, therefore there is a chance for success on "the combination of a boy and a hatchet," for husking corn. In order to secure a patent for this discovery, you must make a model showing the combination, and it must not exceed twelve inches in any of its dimensions. You may be troubled to find a boy in your thrifty State capable of being compressed into this small compass, but in New York City you will find one for suitable pay.

Turbines.—J. R. Clark, of Cohoes, N. Y., informs us that he has recently put in operation for the Harmony Mills, of that place, a turbine of 14½ horse power, which on a fall of 21 feet gives 86¼ per cent of its power. Another feature is that it can be adjusted so as to derive as great a percentage of power from a low as a high fall.

J. A., of Fla.—The air at a hight of fifteen miles is supposed to have so small a pressure from the super-ambient space and attenuated air, that the barometer would stand at ·45 of an inch, and to be of a temperature of 240° Fah. below the freezing point, while at five miles hight from the level of the sea, the barometer would stand at 10·41, and the temperature is about 30·6° below freezing. At the level of the sea the barometer indicates 30 inches, and the temperature is 50° above the freezing point of water, or 0°.

Copper in Tissue.—Messrs. Olding and Dupre, two eminent chemists, have recently published the analysis of 100 different specimens of vegetable and animal tissue; and it appears from their results that copper is an essential element in tissue. The quantity is not large, but still positive. From 100 grains of wheat ash, the authors had obtained ·023 grain, and from a sheep's liver, ·515 grain of oxyd of copper.

J. W. H., of Ill.—The weight of 45 gallons of water will be equal to 375·7 pounds, and the absolute power to raise this weight 25 feet in one minute would be equal to 0·285 horse power. The loss arising from the friction of the working parts of the pump and from the friction of the water in the discharge pipe, will be equal to at least 50 per cent; so that a power of about 0·6 or 3-5 horse power, will be required to work a pump which will lift 45 gallons of water 25 feet high in one minute.

M. A. J., of Ind.—The reason why frosty mornings are usually clear, is because in the cold atmosphere which preceded the frost, there was but little evaporation, and when the frost came, all the vapors are frozen into hoar-frost, and the air is left dry.

S. F. C., of Mexico.—It is a law of optics that the angle of incidence and reflection is always the same, that is to say, that if a perpendicular be constructed from the point on the reflecting surface which a ray of light strikes, it will be reflected the other side the straight line or perpendicular at exactly the same angle.

Oil-Silk Pocket-Books.—We would caution bankers and others against using leather pocket books as a receptacle for valuable papers when deposited in iron safes. The leather absorbs the moisture from the safe, and thus renders the contents liable to mold; but this is not the worst feature, for in case of fire, intense heat will act upon the leather, and the moisture and heat will liquify it so as to render the contents of the pocket-book a mass which it will be difficult to separate. We would recommend an oil-silk case as a good substitute for leather, as it will not only resist the moisture of the safe, but will obviate the trouble likely to arise in case of fire, which leather only increases.

I. E., of Va.—Your "experience" has afforded some amusement, and we would gladly find room for it if we could put it into a shape better fitted for publication. An amusing personal experience might not always afford good materials for the general reader's benefit.

Palatable Castor Oil.—A correspondent informs us that this useful cathartic may be made palatable by the following process, which was communicated to him by an old experienced doctor:—Pulverized gum arabic, 1 drachm, water, two tablespoonfuls; rub together in a mortar, and add castor oil, two tablespoonfuls, common spirits of lavender, one teaspoonful; rub the whole together, and flavor with four or five drops of essence of peppermint. Dose to suit age and habit of person. Valuable in cases of violent irritability of stomach.

Boiler Inquiry—Your boiler containing forty-three 6-feet tubes with 2-inch bore, and 27-inch square fire-box, is 8¾-horse power, is capable of driving a single run of 36-inch burr-stones with your engine for grinding corn, with a pressure of from 35 to 40 lbs. to the square inch.

Patents Attachable.—Letters Patents are not exempt from attachment by a person's creditors on an execution. The interest of a patentee or assignee of a patentee may be sold out in the same manner a piece of real estate is sold under like circumstances. This position is sustained by Curtis on the law of patents, page 226. It is in accordance with the practice of English courts.

A WORD TO OUR PATRONS.

Receipts—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of the receipt of their funds. The Post Office law does not allow publishers to enclose receipts in the paper.

Literary Notices.

Iron Trade of the United States. Edited by B. F. French. New York: Wiley & Halstead. This is a historical and statistical work on this great branch of national industry. It is a pretentious production.

Vernon Grove. New York: Rudd & Carleton, 310 Broadway. This is a work of fiction written by a lady, and does the authoress credit in every way. The characters are well drawn, the plot well conceived, and the unity of the story preserved throughout, and moreover, we are happy to say that there is a moral tone pervading the volume which will recommend it to many readers. Messrs. Rudd & Carleton are doing much to elevate American fiction, and we hope to see more works from them of the same stamp as "Vernon Grove."

A Manual of the Barnyard and Domestic Animals. New York: Fowler & Wells. This is one of that valuable series of manuals which have lately been published by the above house, and which form in themselves a small encyclopædia of knowledge which should be in the library of every farmer or private gentleman who has a taste for "things rural."

United States Engineer. Philadelphia: Van Northwick & Hineline. Weekly, $2 per annum. We have read No. 6 of the above journal. Its principal object seems to be to give a clear synopsis of all the current information concerning the progress of railway engineering in this country, which necessarily covers a wide range of scientific and mechanical subjects. The editor is recommended as a gentleman every way competent to manage such a journal. We wish the "Engineer" success.

The National School Primer. By J. M. Watson. New York: A. S. Barnes & Co. This is a very sensible primer, and would be good for all our private and public schools.

First Book of Natural Philosophy and Astronomy. By W. A. Norton. Chemistry and Allied Sciences. By J. A. Porter. New York: A. S. Barnes & Co. Both of these books are bound and sold together. The authors are professors in Yale College, and have produced a book in the question-and-answer style, which should be in the hands of every student who hopes to be a credit to the science he is studying.

The Atlantic Monthly. Boston: Phillips, Sampson & Co. This periodical improves with a steady and sure gait, and its editors, learning more as they grow older, month by month, impart more life and vigor to their magazine. We have only room to notice the splendid poem of "Nature and the Philosopher," "A Visit to the Autocrat's Landlady," and "Railway Engineering in the United States." These are decidedly the cream of the November number.

STEREOSCOPES AND STEREOSCOPIC VIEWS—We have a large and beautiful assortment of views for the stereoscope—faithful pictures of places of note in Europe and America.
McALLISTER & BROTHER,
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☞ A priced and descriptive Catalogue furnished gratuitously, and sent by mail free of charge. 1*

HOLLELY'S SELF-ACTING BLOWPIPE The best Blowpipe in use for Jewelers, Dentists, Chemists, and Silversmiths. See description in Sci. Am. for October 2d, 1858. Sent to any part of the United States on receipt of price—$8. J. HOLLELY,
9 2* No. 25 Furman st., Brooklyn, L. I.

ARTESIAN WELLS—THE UNDERSIGNED, together with several others in this vicinity, are desirous of having wells of the above description, and take this method of making the fact known to any person who has a practical knowledge of the business of constructing or boring said wells. The advertiser and his associates desire communications addressed to them on the subject, setting forth the probable cost per foot, and such other particulars as will readily suggest themselves to a practical artesian well-borer. Letters may be addressed to STEPHEN SMITH,
1* Goshen, N. Y.

CLAY RETORTS—THOS. HOADLEY, PATentee of the Patent Pyro-clay Gas Retorts—manufactory Nos. 32 and 34 Front st., Cleveland, O. 9 12*

PHOTOGRAPHIC GOODS—S. D. HUMPHREY, Manufacturer, Importer and Dealer, 37 Lispenard st., New York. Price List furnished on receipt of postage s amp. 9 2*

SOMETHING ENTIRELY NEW—SHELL'S Virginia Roach Trap. Patented October 5, 1858. The only trap ever invented that will effectually get rid of these nuisances. Every family in the land are bound to have them. Sell readily—over 3,000 were sold in this city in one month, the past summer. The subscribers having purchased the whole right for the United States, are now prepared to sell State, county, or shop rights. They also want to employ a number of energetic and responsible men to act as agents, principally for the Southern States. To the right kind of men we will offer liberal inducements. Having a large force employed in manufacturing, we are enabled to supply parties with these traps in any quantity at short notice. Address WM. SEARS WOOD & THOMAS N. SHELL, Assignees, Richmond, Va. 9 3*

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TO MACHINE MANUFACTURERS.—Wanted to communicate with a company who has a large shop in New York, New Jersey, or Pennsylvania, and small tools, such as lathes, drills, slabbing machines, planers, &c., suitable to manufacture a small machine; price about $7 or $8, and room to turn out from 150 to 200 per week. Address W. & CO., Box 773, New York City. 1*

SAVE YOUR STEAM—OUR STEAM TRAP (Illustrated in the Sci. Am. of July 24th) for relieving steam pipes of condensed water and keeping back all the steam, is fast superseding everything used. It cannot freeze up; it keeps up the boiler pressure; maintains the full heat, and in most cases will save its cost in three weeks' use. Price $20,
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1* Providence, P. I.

THE NEW BRICK MACHINE IS RECEIVED with favor in all parts of the Union. The rough clay being saturated, is left to soak all night, then shoveled into the machine, by which it is tempered and molded into beautiful bricks—all done by common laborers. The hand machine, worked by one man—brick of usual size—making 4,000 per day, $70. A larger size, worked by a mule, mold 12 by 6 by 3, for the West Indies, $80. One-horse machine, 7,000 per day, $150. Two-horse, 14,000, $200. By steam, 25,000, $400. For further particulars, in a pamphlet giving full instructions on brick-setting and burning, address
FRANCIS H. SMITH,
1* Baltimore, Md.

PAINTER, GILDER AND VARNISHER'S COMPANION—Seventh Edition just ready, containing rules and regulations for everything relating to the arts of Painting, Gilding, Varnishing and Glass-staining, numerous useful and valuable receipts, tests for the detection of adulterations in oils, colors, &c., and a statement of the diseases and accidents to which painters are liable, with the simplest methods of prevention and remedy. 12 mo. Price, 75 cents. Sent by mail free of postage.
HENRY CAREY BAIRD,
7 3* Philadelphia, Pa.

J. & WM. W. CUMBERLAND'S IMPROVED Patent Metallic Oil, for machinery and burning. Warranted to last longer than sperm oil. Manufactured only by the New York Cumberland Metallic Oil Works, foot of East 24th st. Office, No. 205 Broadway, New York. Under the inventor's superintendence. N. B.—See that our brand "New York Cumberland Metallic Oil Works, foot of East 24th street," is upon every package, however small. 1 10*

PIERS, WHARVES, SEA WALLS, &c.—Patent Right for Sale.—I have obtained a patent for my invention to construct piers, wharves, sea walls, and other masonry under water, without the aid of coffer dams. Depth of water or strength of current no obstacle. It is particularly well-adapted to turn old piers or wharves into solid masonry, and permanence and cheapness are combined. I offer it for sale in State, County, or rights for single jobs.
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SOLUBLE GLASS—FIRE, WATER, RUST, and Mildew-proof.—Shingle roofs, railroad bridges, &c., made fireproof; a substitute for linseed oil for paints, and for preparing a good resin and shaving soap; a varnish for instruments, gas-burners, wall paper, public documents, &c.; a cement for terra cotta, &c. Rare Metals, Aluminum, Cadmium, Nickel, Platina, Bismuth, best Plumbago, Asbestos and Manganese, for sale by DR. L. FEUCHTWANGER,
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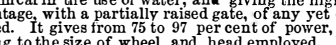

made by this Machine. This is the only stitch that cannot be raveled, and that presents the same appearance upon each side of the seam. It is made with two threads, one upon each side of the fabric, and interlocked in the center of it. Send for a circular. 6 tf

THE WORKS OF THE AUBIN GAS CO., (General Office, No. 44 State st., Albany, N. Y.,) as now perfected, are adapted to all materials and localities, and are in successful operation in villages, factories, and private dwellings. For full information as to cost, probable income of public works, &c., apply as above. For plans, &c., see Scientific American of March 13th. 1 26

STEAM ENGINES, STEAM BOILERS, Steam Pumps, Saw and Grist Mills, Marble Mills, Rice Mills, Quartz Mills for gold quartz, Sugar Mills, Water Wheels, Shafting and Pulleys. The largest assortment of the above in the country, kept constantly on hand by WM. BURDON, 102 Front street, Brooklyn, N. Y. 1 26

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1 12* No. 9 Gold street, New York.

SECOND-HAND MACHINISTS' TOOLS—Viz., Engine and Hand Lathes, Iron Planers, Drills, Chuck Lathe, Gear Cutter and Vises, all in good order, and for sale low for cash. Also one new first-class Woodworth Planing and Matching Machine. Address FRANKLIN SKINNER, Agent, 14 Whitney avenue, New Haven, Conn. 1 13

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PECK'S PATENT DROP PRESS—ALL sizes, used for stamping copper or tin wore, silver ware ornaments, spoons, &c., and for forging gun work, lock work, carriage clips, &c. Also power and foot punching presses, and oval die chucks. Manufactured by MILO PECK & CO., 3 Whitney avenue, New Haven, Conn. 1 14*

IRON AND COMPOSITION CASTINGS, Chilled Rolls, Mill Gearing, Fan Blowers, Trip Hammers, Shafting, Shears, Presses, India Rubber Calenders, Grinding and Cutting Machines, Turbine and Center-vent Water Wheels, also contracts made for Breast and Overshot Wood Wheels, also orders taken for the manufacture of patented machinery of all kinds, by the BIRMINGHAM IRON FOUNDRY, Birmingham, Conn.
1 tf SHELDON BASSETT, President.

EVERY MILLWRIGHT, ALL MILL-OWNERS, and those interested in hydrodynamics, should become acquainted with the merits and principles of the improved Fourneyron Turbine Water Wheel, or the "Universal Turbine," a wheel the most economical in the use of water, and giving the highest percentage, with a partially raised gate, of any yet discovered. It gives from 75 to 97 per cent of power, according to the size of wheel and head employed. For information address S. K. BALDWIN,
Laconia, N. H.
N. B.—For low falls of one, two, or three feet, also for any fall, it will surpass all others. 2 13*

GUILD & GARRISON'S STEAM PUMPS for all kinds of independent steam pumping, for sale at 55 and 57 First street, Williamsburgh, L. I., and 301 Pearl street, New York.
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IRON PLANERS AND ENGINE LATHES of all sizes, also Hand Lathes, Drills, Bolt Cutters, Gear Cutters, Chucks, &c., on hand and finishing. These tools are of superior quality, and are for sale low for cash or approved paper. For cuts giving full description and prices, address "New Haven Manufacturing Co., New Haven, Conn." 1 13

WOODWORTH PLANERS—IRON FRAMES to plane 18 to 24 inches wide—at $90 to $110. For sale by S. C. HILLS, 12 Platt street New York. 1 26

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Science and Art.

New Amalgam.

A correspondent in Paris describes to us a new amalgam which has recently been discovered in that city. The chemist to whom the honor is due is M. Gersham; and this alloy, among other singular properties, possesses that of being almost as soft as wax when it is warm, and of becoming quite hard in the space of a few hours, when allowed to cool; it would, therefore, appear from these facts that this alloy might be employed with great advantage in soldering pieces of metal which it might be inconvenient, as well as impossible, to expose to the heat of a fire, and it may, therefore, become of great use to persons who manufacture *objets d' art*, &c. This amalgam may be modeled by the fingers into various shapes, and we are also told that it adheres strongly to glass and porcelain, as well as to metallic substances, and may, in consequence, serve to mend broken crockery, in which respect it is stated to be equal to the very best mastic.

The mode and materials employed by M. Gersham to prepare this amalgam are as follows:—He takes twenty, thirty, or thirty-six parts of pure copper, which is obtained by precipitation from the sulphate (blue vitriol); concentrated sulphuric acid is then poured on it, and when the mixture has attained the consistence of paste, seventy parts of mercury are added. As soon as the copper has become completely amalgamated, the compound is well washed with boiling water, when it must be allowed to stand for ten or twelve hours. The above operation should be performed in a porcelain or iron vessel. The amalgam thus made will be found quite hard enough to receive a polish like that of silver or brass, and of sufficient hardness to cut either tin or gold.

Among other facts concerning this alloy it may be stated that it is insoluble in weak acids, in alcohol, ether, or boiling water. When about to be employed, it is softened by being exposed to about 375° centigrade—almost four times the temperature of boiling water. As soon as it is reduced to the consistence of wax, it may be employed to solder pieces of metal together, provided the surfaces of the same be entirely free from oxyd, when, after the lapse of ten or twelve hours, they will be found to adhere together so strongly that they may be subjected to any operation whatever, and it is also stated that this alloy may, at the same time, be pressed into molds.

New Feed for Lathes.

His majesty Louis XVI., of France, was a good locksmith; and although, poor man, he lost his head in the delirium of revolution, because he was a king, he should be gratefully remembered by all who admire the mechanic arts. When a king is a fop, all his courtiers follow the example; and in this case, the king being a mechanician, all the court strove to excel each other in the production of fresh mechanical devices "to set before the king." The gentlemen of France became very fond of turning, and it is to that age that we owe the rose engine, and the application of the lathe to ornamental purposes. In this country, nearly one hundred years later, we do by simple mechanism, the result of our own invention, what they, in that age, attained by complex combinations, so much has the world progressed since the days of the ingenious Louis Capet, king of France, who was beheaded by an infuriated mob in 1793. The invention we are about to describe still further demonstrates our progress of invention in this branch of mechanical science, as it is an improved and simple feed-motion for lathes which turn mold, bead, or other ornamental work, and its construction will be understood by reference to the accompanying illustrations, Fig. 1 being a perspective view, and Fig. 2 a back view of the invention.

The rest which carries the tool or cutters, moves lengthwise on ways, in the usual manner. A is the operating lever by which the work is done, simply by its raising and lowering, and by which movement the rest is carried forward by operating on the jointed arm or propeller, B B′, that works in the rack, C. The arm, D, attached to the lever, A, meshes into the rack, E, and holds the rest in its proper place till the tool or cutter, F, has done its work; the lever, A, is then raised and lowered in succession till the work is completed; A is then raised upright, for the purpose of drawing the rest back to the place of beginning. The chain attached to the arm, B′ and A, is for the purpose of holding up the arm till it passes freely over the rack, when the rest is drawn back, to admit of the insertion of another piece of stuff. The tool, G, is the roughing tool that prepares the stuff to

RENNIE'S FEED-MOTION FOR LATHES.

Fig. 2

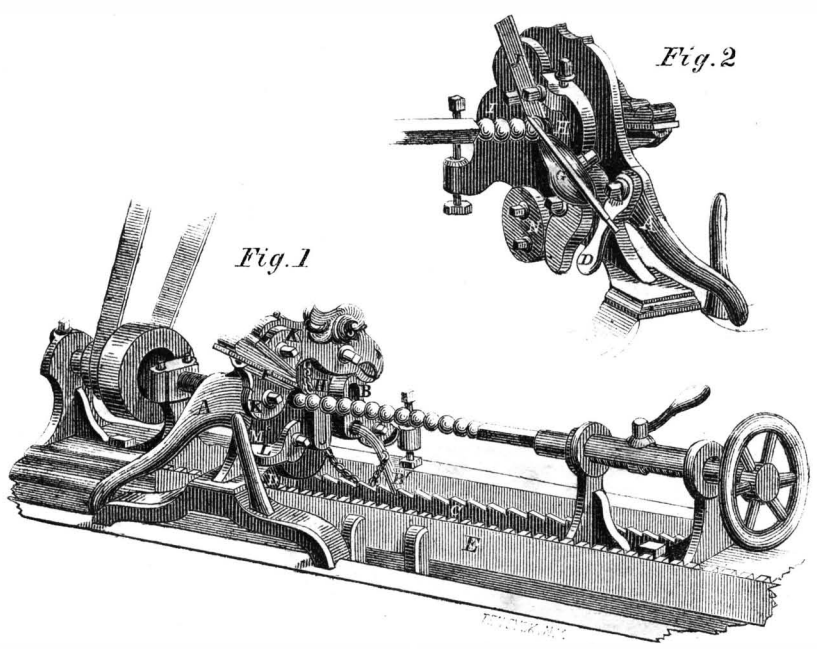

Fig. 1

pass through the mandrel, H, in the usual way; in Fig. 2 the stuff is drawn slightly out, to show the beading cut, but in the machine, the square of the wood is always in contact with G. The tool, J, attached to the piece, I, cuts tenons on the stuff after it has been rounded, and K is an adjustable tool-holder secured to A, carrying the tool, F. L is an adjustable back rest, which keeps the piece from jarring while it is being turned, and it is operated by M from A. The tool, G, is placed in an adjustable holder, and is set by an eccentric, N.

The tools and mandrel can be altered or changed for others of any size and shape, to cut work of any pattern with great rapidity and accuracy, and the device can be attached to any lathe for turning wood. The simplicity and excellence of the invention will be at once seen by the reader.

Any further information can be obtained from the inventor, Adam Rennie, of Binghampton, N. Y. The machine from which our sketch was taken was destroyed in the Crystal Palace. It was patented July 20th, 1858.

IMPROVED VISES.

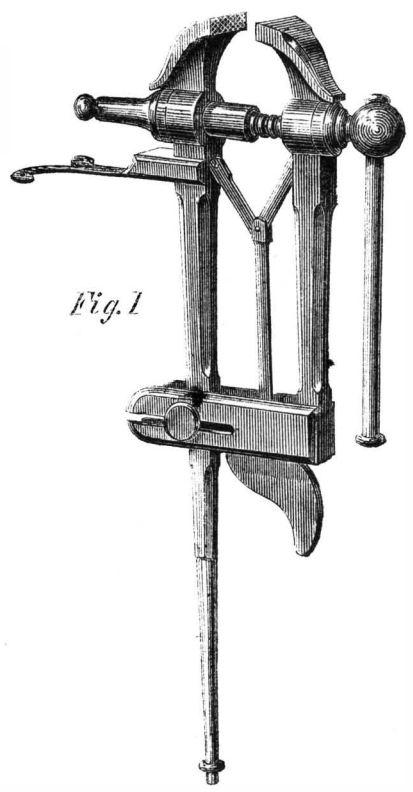

Fig. 1

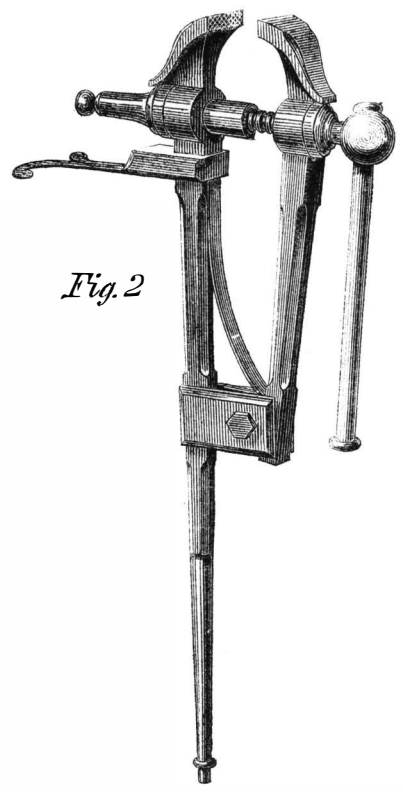

Fig. 2

Parallel vises of various forms have already been made and used for various purposes, but they have been constructed of cast iron, and are more or less defective from the want of strength in the material. Their form has also been such that generally they had to be fastened to the top of the bench, and they are consequently unsteady when used for "chipping" and heavy work.

The solid box parallel vise seen in Fig. 1 has the many advantages of form which the solid box vise has, and can in like manner be fastened to both floor and bench. The outer or short limb is carried out parallel with the long or fixed limb, by means of the toggle links and cam, in the following manner:—

One end of each of the short links is fastened to the limbs of the vise just below the box and screw, and the lower end of the long link is connected with the cam. The small end of the cam is connected with the long limb between the slotted guide plates. As the screw is run back to move out the short limb, the short links are opened, and they draw up the cam, whose shape is such that as it is drawn up, it moves out the lower end of the short limb, precisely at the same rate at which the screw draws out the upper end, and at the same time makes a firm bearing when the jaws grip the work.

Fig. 2 is an illustration of an improvement on the common solid box vises, which enables the workman to get a stronger grip with the same amount of power, and enables the box and screw to wear much longer. This improvement consists in having rounded projections on each side of the eye, and a corresponding recess in the collar of the box and screw, so that no matter at what angle the limbs are placed, the pull or strain will always be on the center line of the box and screw, and the wear on the threads be always uniform.

These vises are manufactured by Messrs. Morris & Coltart, Pittsburg, Pa., who will be happy to give any further information. We understand that they are not only good, but have the additional recommendation of being cheap.

Seal's Gas Generator.

On Monday of last week we witnessed a very interesting experiment with the new gas generator of G. W. R. Seal, of Winchester, Va., which was described on page 362, Volume XIII., Scientific American. The generator was of quite small dimensions, not occupying more space than a common heater for dwellings; yet it operated well, and appeared to be very well adapted for small factories, workshops and large private homes,—a great desideratum. The materials used to generate the gas were dry oak wood and waste grease which were converted into gas with facility; any person being capable of managing the generator after five minutes instruction, owing to its great simplicity.

INVENTORS, MILLWRIGHTS. FARMERS AND MANUFACTURERS.

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